

## FCC Test Report

### (PART 22)

**Report No.:** RF180125C14-4

**FCC ID:** B94HNQ10CPD

**Test Model:** HSN-Q10C

**Received Date:** Feb. 05, 2018

**Test Date:** Mar. 21, 2018 ~ May 23, 2018

**Issued Date:** Jun. 01, 2018

**Applicant:** HP Inc.

**Address:** 3390 East Harmony Road, Fort Collins, Colorado 80528, United States

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan  
( R.O.C )

**Test Location (1):** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan  
Hsien 333, Taiwan, R.O.C.

**Test Location (2):** No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan,  
R.O.C

**FCC Registration /  
Designation Number:** 427177 / TW0011



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### Release Control Record

| Issue No.     | Description      | Date Issued   |
|---------------|------------------|---------------|
| RF180125C14-4 | Original Release | Jun. 01, 2018 |

## 1 Certificate of Conformity

**Product:** Notebook Computer

**Brand:** HP

**Test Model:** HSN-Q10C

**Sample Status:** Production Unit

**Applicant:** HP Inc.

**Test Date:** Mar. 21, 2018 ~ May 23, 2018

**Standards:** FCC Part 22, Subpart H

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :** Evonne Liu, **Date:** Jun. 01, 2018  
Evonne Liu / Specialist

**Approved by :** Dylan Chiou, **Date:** Jun. 01, 2018  
Dylan Chiou / Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 22 & Part 2 |                              |        |                                                                                      |
|----------------------------------------|------------------------------|--------|--------------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                    | Result | Remarks                                                                              |
| 2.1046<br>22.913 (a)                   | Effective Radiated Power     | Pass   | Meet the requirement of limit.                                                       |
| ---                                    | Peak to Average Ratio        | Pass   | Meet the requirement of limit.                                                       |
| 2.1055<br>22.355                       | Frequency Stability          | Pass   | Meet the requirement of limit.                                                       |
| 2.1049                                 | Occupied Bandwidth           | Pass   | Meet the requirement of limit.                                                       |
| 22.917                                 | Band Edge Measurements       | Pass   | Meet the requirement of limit.                                                       |
| 2.1051<br>22.917                       | Conducted Spurious Emissions | Pass   | Meet the requirement of limit.                                                       |
| 2.1053<br>22.917                       | Radiated Spurious Emissions  | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -32.62 dB at 153.12 MHz. |

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement                        | Frequency          | Expanded Uncertainty (k=2) (±) |
|------------------------------------|--------------------|--------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz   | 2.44 dB                        |
| Radiated Emissions up to 1 GHz     | 30 MHz ~ 200 MHz   | 2.0153 dB                      |
|                                    | 200 MHz ~ 1000 MHz | 2.0224 dB                      |
| Radiated Emissions above 1 GHz     | 1 GHz ~ 18 GHz     | 1.0121 dB                      |
|                                    | 18 GHz ~ 40 GHz    | 1.1508 dB                      |

## 2.2 Test Site and Instruments

| Description & Manufacturer                     | Model No.            | Serial No.                                                        | Date of Calibration | Due Date of Calibration |
|------------------------------------------------|----------------------|-------------------------------------------------------------------|---------------------|-------------------------|
| Test Receiver<br>Agilent Technologies          | N9038A               | MY52260177                                                        | Jul. 05, 2017       | Jul. 04, 2018           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43                | 101261                                                            | Jan. 11, 2018       | Jan. 10, 2019           |
| Double Ridge Guide Horn<br>Antenna EMCO        | 3115                 | 5619                                                              | Nov. 30, 2017       | Nov. 29, 2018           |
| HORN Antenna<br>ETS                            | 3117                 | 00034128                                                          | Dec. 14, 2017       | Dec. 13, 2018           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB 9168            | 9168-153                                                          | Dec. 06, 2017       | Dec. 05, 2018           |
| Fixed Attenuator<br>Mini-Circuits              | BW-N10W5+            | NA                                                                | Jul. 07, 2017       | Jul. 06, 2018           |
| Preamplifier<br>Agilent                        | 310N                 | 187226                                                            | Jun. 23, 2017       | Jun. 22, 2018           |
| Preamplifier<br>Agilent                        | 83017A               | MY39501357                                                        | Jun. 23, 2017       | Jun. 22, 2018           |
| RF signal cable<br>ETS-LINDGREN                | 5D-FB                | Cable-CH1-01(R<br>FC-SMS-100-SM<br>S-120+RFC-SMS<br>-100-SMS-400) | Jun. 23, 2017       | Jun. 22, 2018           |
| RF signal cable<br>ETS-LINDGREN                | 8D-FB                | Cable-CH1-02(R<br>FC-SMS-100-SM<br>S-24)                          | Jun. 23, 2017       | Jun. 22, 2018           |
| Software<br>BV ADT                             | E3<br>8.130425b      | NA                                                                | NA                  | NA                      |
| Antenna Tower<br>MF                            | NA                   | NA                                                                | NA                  | NA                      |
| Turn Table<br>MF                               | NA                   | NA                                                                | NA                  | NA                      |
| Antenna Tower & Turn<br>Table Controller<br>MF | MF-7802              | NA                                                                | NA                  | NA                      |
| Communications<br>Tester-Wireless<br>Agilent   | 8960 Series 10       | MY53201073                                                        | Jun. 28, 2017       | Jun. 27, 2019           |
| Radio Communication<br>Analyzer<br>Anritsu     | MT8820C              | 6201010284                                                        | Dec. 28, 2017       | Dec. 27, 2018           |
| Temperature & Humidity<br>Chamber              | GTH-120-40-CP-A<br>R | MAA1306-019                                                       | Sep. 08, 2017       | Sep. 07, 2018           |
| DC Power Supply<br>Topward                     | 33010D               | 807748                                                            | Oct. 25, 2016       | Oct. 24, 2018           |
| Digital Multimeter<br>Fluke                    | 87-III               | 70360742                                                          | Jun. 30, 2017       | Jun. 29, 2018           |

- Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The IC Site Registration No. is IC7450I-1.

### 3 General Information

#### 3.1 General Description of EUT

|                            |                                        |                   |
|----------------------------|----------------------------------------|-------------------|
| <b>Product</b>             | Notebook Computer                      |                   |
| <b>Brand</b>               | HP                                     |                   |
| <b>Test Model</b>          | HSN-Q10C                               |                   |
| <b>Status of EUT</b>       | Production Unit                        |                   |
| <b>Power Supply Rating</b> | 20 or 15 or 12 or 9 or 5 Vdc (Adapter) |                   |
| <b>Modulation Type</b>     | WCDMA                                  | QPSK              |
|                            | LTE                                    | QPSK, 16QAM       |
| <b>Frequency Range</b>     | WCDMA                                  | 826.4 ~ 846.6 MHz |
|                            | LTE 5 (Channel Bandwidth: 1.4 MHz)     | 824.7 ~ 848.3 MHz |
|                            | LTE 5 (Channel Bandwidth: 3 MHz)       | 825.5 ~ 847.5 MHz |
|                            | LTE 5 (Channel Bandwidth: 5 MHz)       | 826.5 ~ 846.5 MHz |
|                            | LTE 5 (Channel Bandwidth: 10 MHz)      | 829 ~ 844 MHz     |
|                            | LTE 26 (Channel Bandwidth: 1.4 MHz)    | 824.7 ~ 848.3 MHz |
|                            | LTE 26 (Channel Bandwidth: 3 MHz)      | 825.5 ~ 847.5 MHz |
|                            | LTE 26 (Channel Bandwidth: 5 MHz)      | 826.5 ~ 846.5 MHz |
|                            | LTE 26 (Channel Bandwidth: 10 MHz)     | 829 ~ 844 MHz     |
|                            | LTE 26 (Channel Bandwidth: 15 MHz)     | 831.5 ~ 841.5 MHz |
| <b>Max. ERP Power</b>      | WCDMA                                  | 36.12 mW          |
|                            | LTE 5 (Channel Bandwidth: 1.4 MHz)     | 31.93 mW          |
|                            | LTE 5 (Channel Bandwidth: 3 MHz)       | 31.99 mW          |
|                            | LTE 5 (Channel Bandwidth: 5 MHz)       | 31.90 mW          |
|                            | LTE 5 (Channel Bandwidth: 10 MHz)      | 32.58 mW          |
|                            | LTE 26 (Channel Bandwidth: 1.4 MHz)    | 32.14 mW          |
|                            | LTE 26 (Channel Bandwidth: 3 MHz)      | 32.00 mW          |
|                            | LTE 26 (Channel Bandwidth: 5 MHz)      | 32.28 mW          |
|                            | LTE 26 (Channel Bandwidth: 10 MHz)     | 32.58 mW          |
|                            | LTE 26 (Channel Bandwidth: 15 MHz)     | 32.81 mW          |
| <b>Emission Designator</b> | WCDMA                                  | 4M09F9W           |
|                            | LTE 5 (Channel Bandwidth: 1.4 MHz)     | 1M09G7D           |
|                            | LTE 5 (Channel Bandwidth: 3 MHz)       | 2M70W7D           |
|                            | LTE 5 (Channel Bandwidth: 5 MHz)       | 4M50W7D           |
|                            | LTE 5 (Channel Bandwidth: 10 MHz)      | 9M01W7D           |
|                            | LTE 26 (Channel Bandwidth: 1.4 MHz)    | 1M10W7D           |
|                            | LTE 26 (Channel Bandwidth: 3 MHz)      | 2M71G7D           |
|                            | LTE 26 (Channel Bandwidth: 5 MHz)      | 4M50W7D           |
|                            | LTE 26 (Channel Bandwidth: 10 MHz)     | 9M01W7D           |
|                            | LTE 26 (Channel Bandwidth: 15 MHz)     | 13M5W7D           |
| <b>Antenna Type</b>        | Refer to Note as below                 |                   |
| <b>Accessory Device</b>    | Refer to Note as below                 |                   |
| <b>Data Cable Supplied</b> | Refer to Note as below                 |                   |

Note:

1. The WWAN module (Brand: Fibocom, Model: L850-GL) was installed in the EUT.
2. The EUT contains following accessory devices.

| Product | Brand | Model    | Description                                                                                                      |
|---------|-------|----------|------------------------------------------------------------------------------------------------------------------|
| Adapter | hp    | TPN-LA12 | I/P: 100-240 Vac, 50-60 Hz, 1.6 A<br>O/P: 20 Vdc, 3.25 A, 15 Vdc, 4.33 A,<br>12 Vdc, 5 A, 9 Vdc, 3 A, 5 Vdc, 3 A |

3. The antenna information is listed as below.

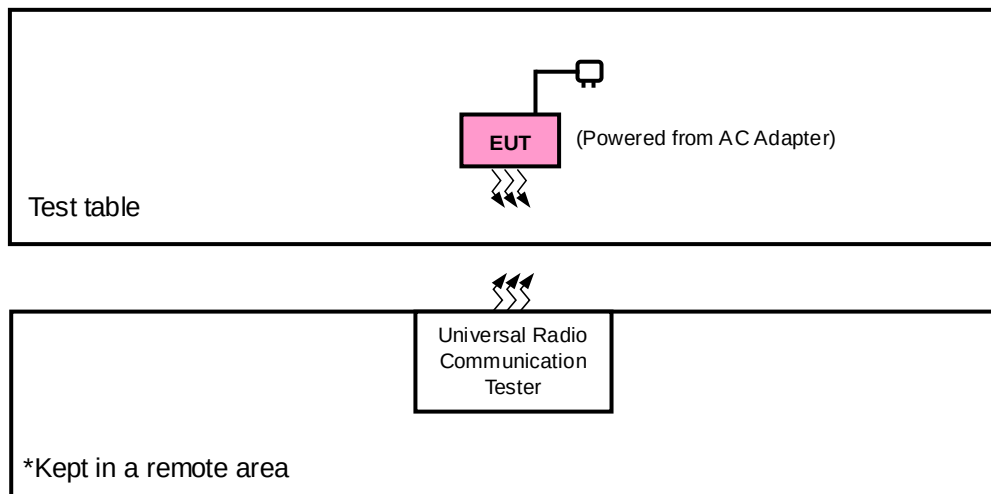
| Ant. Type | Manuf. | Parts Number                                                                                                      | Antenna Gain                            |                                         |                                        |       |                    |        |        |        |
|-----------|--------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-----------------------------------------|----------------------------------------|-------|--------------------|--------|--------|--------|
|           |        |                                                                                                                   | LTE 2 /<br>LTE 25 /<br>WCDMA<br>Band II | LTE 4 /<br>LTE 66 /<br>WCDMA<br>Band IV | LTE 5 /<br>LTE 26 /<br>WCDMA<br>Band V | LTE 7 | LTE 12 /<br>LTE 17 | LTE 13 | LTE 30 | LTE 41 |
| PIFA      | INPAQ  | Main Ant.:<br>DQ6LB020017<br>(WA-P-LTE8LTE12LBB-02-001)<br>Aux Ant.:<br>DQ6LB020017<br>(WA-P-LTE8LTE12LBB-02-001) | -6.19                                   | -5.79                                   | -5.86                                  | -4.9  | -5.21              | -4.32  | -3.68  | -4.9   |

| Antenna Type | Vendor | Part Number                                         | Antenna Gain (dBi) |                |                |                |
|--------------|--------|-----------------------------------------------------|--------------------|----------------|----------------|----------------|
|              |        |                                                     | Laptop PC Mode     |                |                |                |
|              |        |                                                     | WLAN<br>2.4GHz     | WLAN<br>5.2GHz | WLAN<br>5.5GHz | WLAN<br>5.8GHz |
| PIFA         | INPAQ  | WLAN Main Antenna:<br>DQ6LB020509 (WA-P-LBB-02-059) | 1.66               | 0.54           | 0.56           | -0.21          |
|              |        | WLAN Aux Antenna:<br>DQ6LB020509 (WA-P-LBB-02-059)  | -0.36              | 3.36           | 2.21           | 3.08           |

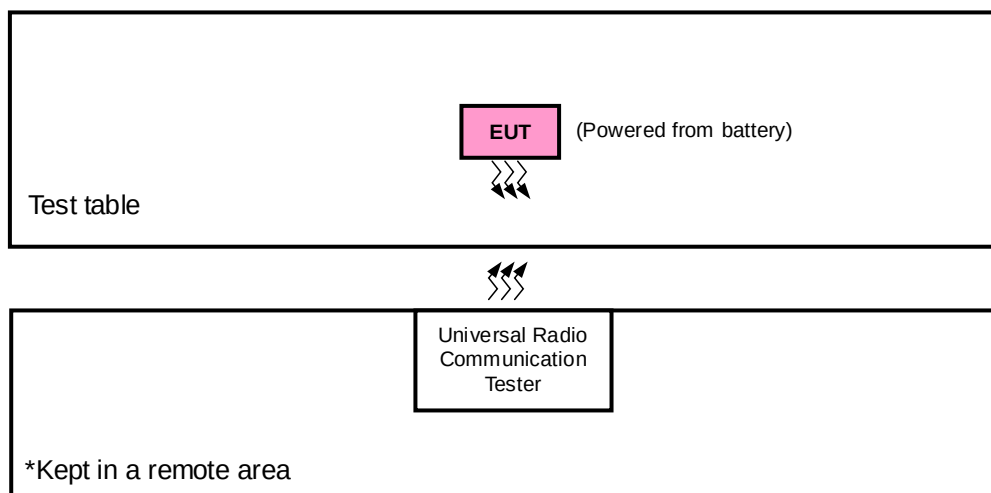
4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

### 3.2 Configuration of System under Test

#### <Radiated Emission Test>



#### <E.R.P. Test>



#### 3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

### 3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports.

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below.

| Band        | ERP     | Radiated Emission |
|-------------|---------|-------------------|
| WCDMA       | Z-plane | Z-axis            |
| LTE Band 5  | Z-plane | Z-axis            |
| LTE Band 26 | Z-plane | X-axis            |

#### WCDMA

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel   | Mode  |
|--------------------|-----------------------|-------------------|------------------|-------|
| -                  | ERP                   | 4132 to 4233      | 4132, 4182, 4233 | WCDMA |
| -                  | Frequency Stability   | 4132 to 4233      | 4132, 4233       | WCDMA |
| -                  | Occupied Bandwidth    | 4132 to 4233      | 4132, 4182, 4233 | WCDMA |
| -                  | Band Edge             | 4132 to 4233      | 4132, 4233       | WCDMA |
| -                  | Peak to Average Ratio | 4132 to 4233      | 4132, 4182, 4233 | WCDMA |
| -                  | Conducted Emission    | 4132 to 4233      | 4132, 4182, 4233 | WCDMA |
| -                  | Radiated Emission     | 4132 to 4233      | 4132, 4182, 4233 | WCDMA |

## LTE Band 5

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode                |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------|---------------------|
| -                  | ERP                   | 20407 to 20643    | 20407, 20525, 20643 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 2 RB Offset  |
|                    |                       | 20415 to 20635    | 20415, 20525, 20635 | 3 MHz             | QPSK, 16QAM | 1 RB / 7 RB Offset  |
|                    |                       | 20425 to 20625    | 20425, 20525, 20625 | 5 MHz             | QPSK, 16QAM | 1 RB / 12 RB Offset |
|                    |                       | 20450 to 20600    | 20450, 20525, 20600 | 10 MHz            | QPSK, 16QAM | 1 RB / 24 RB Offset |
| -                  | Frequency Stability   | 20407 to 20643    | 20407, 20643        | 1.4 MHz           | QPSK        | 1 RB / 2 RB Offset  |
|                    |                       | 20415 to 20635    | 20415, 20635        | 3 MHz             | QPSK        | 1 RB / 7 RB Offset  |
|                    |                       | 20425 to 20625    | 20425, 20625        | 5 MHz             | QPSK        | 1 RB / 12 RB Offset |
|                    |                       | 20450 to 20600    | 20450, 20600        | 10 MHz            | QPSK        | 1 RB / 24 RB Offset |
| -                  | Occupied Bandwidth    | 20407 to 20643    | 20407, 20525, 20643 | 1.4 MHz           | QPSK, 16QAM | 6 RB / 0 RB Offset  |
|                    |                       | 20415 to 20635    | 20415, 20525, 20635 | 3 MHz             | QPSK, 16QAM | 15 RB / 0 RB Offset |
|                    |                       | 20425 to 20625    | 20425, 20525, 20625 | 5 MHz             | QPSK, 16QAM | 25 RB / 0 RB Offset |
|                    |                       | 20450 to 20600    | 20450, 20525, 20600 | 10 MHz            | QPSK, 16QAM | 50 RB / 0 RB Offset |
| -                  | Band Edge             | 20407 to 20643    | 20407               | 1.4MHz            | QPSK        | 1 RB / 0 RB Offset  |
|                    |                       |                   | 20643               | 1.4MHz            | QPSK        | 6 RB / 0 RB Offset  |
|                    |                       | 20415 to 20635    | 20415               | 3 MHz             | QPSK        | 1 RB / 5 RB Offset  |
|                    |                       |                   | 20635               | 3 MHz             | QPSK        | 6 RB / 0 RB Offset  |
|                    |                       | 20425 to 20625    | 20425               | 5 MHz             | QPSK        | 1 RB / 0 RB Offset  |
|                    |                       |                   | 20625               | 5 MHz             | QPSK        | 15 RB / 0 RB Offset |
|                    |                       | 20450 to 20600    | 20450               | 10 MHz            | QPSK        | 1 RB / 14 RB Offset |
|                    |                       |                   | 20600               | 10 MHz            | QPSK        | 25 RB / 0 RB Offset |
|                    |                       | 20407 to 20643    | 20407, 20525, 20643 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset  |
|                    |                       |                   | 20415, 20525, 20635 | 3 MHz             | QPSK, 16QAM | 25 RB / 0 RB Offset |
|                    |                       | 20425 to 20625    | 20425, 20525, 20625 | 5 MHz             | QPSK, 16QAM | 50 RB / 0 RB Offset |
|                    |                       |                   | 20450, 20525, 20600 | 10 MHz            | QPSK, 16QAM | 1 RB / 24 RB Offset |
| -                  | Peak to Average Ratio | 20407 to 20643    | 20407, 20525, 20643 | 1.4 MHz           | QPSK, 16QAM | 6 RB / 0 RB Offset  |
|                    |                       | 20415 to 20635    | 20415, 20525, 20635 | 3 MHz             | QPSK, 16QAM | 15 RB / 0 RB Offset |
|                    |                       | 20425 to 20625    | 20425, 20525, 20625 | 5 MHz             | QPSK, 16QAM | 25 RB / 0 RB Offset |
|                    |                       | 20450 to 20600    | 20450, 20525, 20600 | 10 MHz            | QPSK, 16QAM | 50 RB / 0 RB Offset |
| -                  | Conducted Emission    | 20407 to 20643    | 20407, 20525, 20643 | 1.4 MHz           | QPSK        | 1 RB / 2 RB Offset  |
|                    |                       | 20415 to 20635    | 20415, 20525, 20635 | 3 MHz             | QPSK        | 1 RB / 7 RB Offset  |
|                    |                       | 20425 to 20625    | 20425, 20525, 20625 | 5 MHz             | QPSK        | 1 RB / 12 RB Offset |
|                    |                       | 20450 to 20600    | 20450, 20525, 20600 | 10 MHz            | QPSK        | 1 RB / 24 RB Offset |
| -                  | Radiated Emission     | 20407 to 20643    | 20407, 20525, 20643 | 1.4 MHz           | QPSK        | 1 RB / 2 RB Offset  |
|                    |                       | 20425 to 20625    | 20425, 20525, 20625 | 5 MHz             | QPSK        | 1 RB / 12 RB Offset |
|                    |                       | 20450 to 20600    | 20450, 20525, 20600 | 10 MHz            | QPSK        | 1 RB / 24 RB Offset |

**Note:** This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

## LTE Band 26

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode                                       |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------|--------------------------------------------|
| -                  | ERP                   | 26797 to 27033    | 26797, 26915, 27033 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 5 RB Offset                         |
|                    |                       | 26805 to 27025    | 26805, 26915, 27025 | 3 MHz             | QPSK, 16QAM | 1 RB / 14 RB Offset                        |
|                    |                       | 26815 to 27015    | 26815, 26915, 27015 | 5 MHz             | QPSK, 16QAM | 1 RB / 24 RB Offset                        |
|                    |                       | 26840 to 26990    | 26840, 26915, 26990 | 10 MHz            | QPSK, 16QAM | 1 RB / 49 RB Offset                        |
|                    |                       | 26865 to 26965    | 26865, 26915, 26965 | 15 MHz            | QPSK, 16QAM | 1 RB / 49 RB Offset                        |
| -                  | Frequency Stability   | 26797 to 27033    | 26797, 27033        | 1.4 MHz           | QPSK        | 1 RB / 5 RB Offset                         |
|                    |                       | 26805 to 27025    | 26805, 27025        | 3 MHz             | QPSK        | 1 RB / 14 RB Offset                        |
|                    |                       | 26815 to 27015    | 26815, 27015        | 5 MHz             | QPSK        | 1 RB / 24 RB Offset                        |
|                    |                       | 26840 to 26990    | 26840, 26990        | 10 MHz            | QPSK        | 1 RB / 49 RB Offset                        |
|                    |                       | 26865 to 26965    | 26865, 26965        | 15 MHz            | QPSK        | 1 RB / 49 RB Offset                        |
| -                  | Occupied Bandwidth    | 26797 to 27033    | 26797, 26915, 27033 | 1.4 MHz           | QPSK, 16QAM | 6 RB / 0 RB Offset                         |
|                    |                       | 26805 to 27025    | 26805, 26915, 27025 | 3 MHz             | QPSK, 16QAM | 15 RB / 0 RB Offset                        |
|                    |                       | 26815 to 27015    | 26815, 26915, 27015 | 5 MHz             | QPSK, 16QAM | 25 RB / 0 RB Offset                        |
|                    |                       | 26840 to 26990    | 26840, 26915, 26990 | 10 MHz            | QPSK, 16QAM | 50 RB / 0 RB Offset                        |
|                    |                       | 26865 to 26965    | 26865, 26915, 26965 | 15 MHz            | QPSK, 16QAM | 75 RB / 0 RB Offset                        |
| -                  | Band Edge             | 26797 to 27033    | 26797               | 1.4 MHz           | QPSK        | 1 RB / 0 RB Offset<br>6 RB / 0 RB Offset   |
|                    |                       |                   | 27033               | 1.4 MHz           | QPSK        | 1 RB / 5 RB Offset<br>6 RB / 0 RB Offset   |
|                    |                       | 26805 to 27025    | 26805               | 3 MHz             | QPSK        | 1 RB / 0 RB Offset<br>15 RB / 0 RB Offset  |
|                    |                       |                   | 27025               | 3 MHz             | QPSK        | 1 RB / 14 RB Offset<br>15 RB / 0 RB Offset |
|                    |                       | 26815 to 27015    | 26815               | 5 MHz             | QPSK        | 1 RB / 0 RB Offset<br>25 RB / 0 RB Offset  |
|                    |                       |                   | 27015               | 5 MHz             | QPSK        | 1 RB / 24 RB Offset<br>25 RB / 0 RB Offset |
|                    |                       | 26840 to 26990    | 26840               | 10 MHz            | QPSK        | 1 RB / 0 RB Offset<br>50 RB / 0 RB Offset  |
|                    |                       |                   | 26990               | 10 MHz            | QPSK        | 1 RB / 49 RB Offset<br>50 RB / 0 RB Offset |
|                    |                       | 26865 to 26965    | 26865               | 15 MHz            | QPSK        | 1 RB / 0 RB Offset<br>75 RB / 0 RB Offset  |
|                    |                       |                   | 26965               | 15 MHz            | QPSK        | 1 RB / 74 RB Offset<br>75 RB / 0 RB Offset |
| -                  | Peak to Average Ratio | 26797 to 27033    | 26797, 26915, 27033 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset                         |
|                    |                       | 26805 to 27025    | 26805, 26915, 27025 | 3 MHz             | QPSK, 16QAM | 15 RB / 0 RB Offset                        |
|                    |                       | 26815 to 27015    | 26815, 26915, 27015 | 5 MHz             | QPSK, 16QAM | 25 RB / 0 RB Offset                        |
|                    |                       | 26840 to 26990    | 26840, 26915, 26990 | 10 MHz            | QPSK, 16QAM | 50 RB / 0 RB Offset                        |
|                    |                       | 26865 to 26965    | 26865, 26915, 26965 | 15 MHz            | QPSK, 16QAM | 75 RB / 0 RB Offset                        |
| -                  | Conducted Emission    | 26797 to 27033    | 26797, 26915, 27033 | 1.4 MHz           | QPSK        | 1 RB / 0 RB Offset                         |
|                    |                       | 26805 to 27025    | 26805, 26915, 27025 | 3 MHz             | QPSK        | 15 RB / 0 RB Offset                        |
|                    |                       | 26815 to 27015    | 26815, 26915, 27015 | 5 MHz             | QPSK        | 25 RB / 0 RB Offset                        |
|                    |                       | 26840 to 26990    | 26840, 26915, 26990 | 10 MHz            | QPSK        | 1 RB / 0 RB Offset                         |
|                    |                       | 26865 to 26965    | 26865, 26915, 26965 | 15 MHz            | QPSK        | 25 RB / 0 RB Offset                        |
| -                  | Radiated Emission     | 26797 to 27033    | 26797, 26915, 27033 | 1.4 MHz           | QPSK        | 1 RB / 0 RB Offset                         |
|                    |                       | 26815 to 27015    | 26815, 26915, 27015 | 5 MHz             | QPSK        | 25 RB / 0 RB Offset                        |
|                    |                       | 26865 to 26965    | 26865, 26915, 26965 | 15 MHz            | QPSK        | 25 RB / 0 RB Offset                        |

**Note:** This device was tested under all bandwidths, RB configurations and modulations. The worst case was

found in QPSK modulation.

**Test Condition:**

| Test Item             | Environmental Conditions | Input Power    | Tested By |
|-----------------------|--------------------------|----------------|-----------|
| ERP                   | 25 deg. C, 65 % RH       | 6.54 Vdc       | Karl Lee  |
| Frequency Stability   | 25 deg. C, 65 % RH       | 6.54 Vdc       | Wayne Lin |
| Occupied Bandwidth    | 25 deg. C, 65 % RH       | 6.54 Vdc       | Wayne Lin |
| Band Edge             | 25 deg. C, 65 % RH       | 6.54 Vdc       | Wayne Lin |
| Peak to Average Ratio | 25 deg. C, 65 % RH       | 6.54 Vdc       | Wayne Lin |
| Conducted Emission    | 25 deg. C, 65 % RH       | 6.54 Vdc       | Wayne Lin |
| Radiated Emission     | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Karl Lee  |

### 3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

### 3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 22**

**KDB 971168 D01 Power Meas License Digital Systems v02r02**

**ANSI/TIA/EIA-603-E 2016**

**ANSI 63.26-2015**

**Note:** All test items have been performed and recorded as per the above standards.

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 7 watts e.r.p.

#### 4.1.2 Test Procedures

##### **EIRP / ERP Measurement:**

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1 MHz for GSM, GPRS & EDGE, and 5 MHz for WCDMA and CDMA, and 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G.
- d.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated from E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15 \text{ dBi}$ .

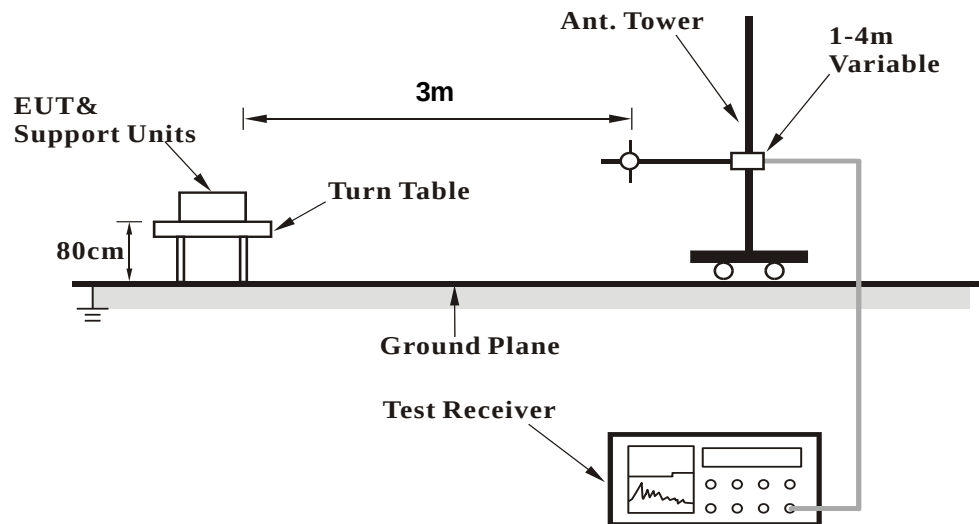
##### **Conducted Power Measurement:**

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

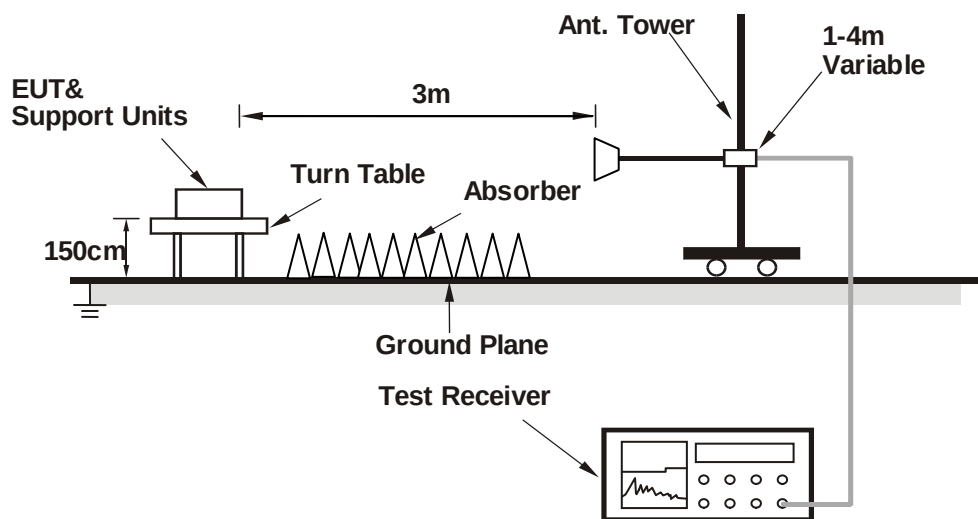
#### 4.1.3 Test Setup

##### EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.4 Test Results

| Band            | WCDMA Band V |       |       | 3GPP<br>MPR<br>(dB) |
|-----------------|--------------|-------|-------|---------------------|
| Channel         | 4132         | 4182  | 4233  |                     |
| Frequency (MHz) | 826.4        | 836.4 | 846.6 |                     |
| RMC 12.2K       | 23.56        | 23.24 | 23.42 | -                   |
| HSDPA Subtest-1 | 23.54        | 23.22 | 23.40 | 0                   |
| HSDPA Subtest-2 | 23.11        | 22.79 | 22.97 | 0                   |
| HSDPA Subtest-3 | 22.63        | 22.31 | 22.49 | 0.5                 |
| HSDPA Subtest-4 | 22.38        | 22.06 | 22.24 | 0.5                 |
| HSUPA Subtest-1 | 23.17        | 22.85 | 23.03 | 0                   |
| HSUPA Subtest-2 | 21.02        | 20.70 | 20.88 | 2                   |
| HSUPA Subtest-3 | 21.73        | 21.41 | 21.59 | 1                   |
| HSUPA Subtest-4 | 21.31        | 20.99 | 21.17 | 2                   |
| HSUPA Subtest-5 | 23.22        | 22.90 | 23.08 | 0                   |

| LTE Band 5 |              |                 |              |       |       |       |                     |      |              |                 |              |       |       |       |                     |
|------------|--------------|-----------------|--------------|-------|-------|-------|---------------------|------|--------------|-----------------|--------------|-------|-------|-------|---------------------|
| BW         | MCS<br>Index | RB<br>Size      | RB<br>Offset | Low   | Mid   | High  | 3GPP<br>MPR<br>(dB) | BW   | MCS<br>Index | RB<br>Size      | RB<br>Offset | Low   | Mid   | High  | 3GPP<br>MPR<br>(dB) |
|            |              | Channel         |              | 20450 | 20525 | 20600 |                     |      |              | Channel         |              | 20425 | 20525 | 20625 |                     |
|            |              | Frequency (MHz) |              | 829.0 | 836.5 | 844.0 |                     |      |              | Frequency (MHz) |              | 826.5 | 836.5 | 846.5 |                     |
| 10M        | QPSK         | 1               | 0            | 22.93 | 22.56 | 22.95 | 0                   | 5M   | QPSK         | 1               | 0            | 22.88 | 22.49 | 22.90 | 0                   |
|            |              | 1               | 24           | 22.68 | 22.48 | 22.78 | 0                   |      |              | 1               | 12           | 22.62 | 22.41 | 22.72 | 0                   |
|            |              | 1               | 49           | 22.66 | 22.50 | 22.84 | 0                   |      |              | 1               | 24           | 22.60 | 22.43 | 22.79 | 0                   |
|            |              | 25              | 0            | 21.82 | 21.50 | 22.00 | 1                   |      |              | 12              | 0            | 21.73 | 21.37 | 21.92 | 1                   |
|            |              | 25              | 12           | 21.73 | 21.48 | 21.82 | 1                   |      |              | 12              | 6            | 21.63 | 21.34 | 21.73 | 1                   |
|            |              | 25              | 25           | 21.71 | 21.49 | 21.97 | 1                   |      |              | 12              | 13           | 21.59 | 21.36 | 21.89 | 1                   |
|            |              | 50              | 0            | 21.77 | 21.48 | 21.84 | 1                   |      |              | 25              | 0            | 21.68 | 21.34 | 21.76 | 1                   |
|            | 16QAM        | 1               | 0            | 21.98 | 21.57 | 22.00 | 1                   |      | 16QAM        | 1               | 0            | 21.92 | 21.52 | 21.95 | 1                   |
|            |              | 1               | 24           | 21.72 | 21.49 | 21.82 | 1                   |      |              | 1               | 12           | 21.66 | 21.41 | 21.77 | 1                   |
|            |              | 1               | 49           | 21.69 | 21.51 | 21.88 | 1                   |      |              | 1               | 24           | 21.62 | 21.45 | 21.83 | 1                   |
|            |              | 25              | 0            | 20.82 | 20.47 | 20.96 | 2                   |      |              | 12              | 0            | 20.69 | 20.32 | 20.90 | 2                   |
|            |              | 25              | 12           | 20.73 | 20.44 | 20.82 | 2                   |      |              | 12              | 6            | 20.56 | 20.29 | 20.71 | 2                   |
|            |              | 25              | 25           | 20.68 | 20.46 | 20.98 | 2                   |      |              | 12              | 13           | 20.54 | 20.31 | 20.87 | 2                   |
|            |              | 50              | 0            | 20.77 | 20.44 | 20.85 | 2                   |      |              | 25              | 0            | 20.60 | 20.29 | 20.74 | 2                   |
| 3M         | QPSK         | 1               | 0            | 22.83 | 22.42 | 22.85 | 0                   | 1.4M | QPSK         | 1               | 0            | 22.77 | 22.32 | 22.80 | 0                   |
|            |              | 1               | 7            | 22.55 | 22.31 | 22.67 | 0                   |      |              | 1               | 2            | 22.48 | 22.21 | 22.59 | 0                   |
|            |              | 1               | 14           | 22.52 | 22.36 | 22.74 | 0                   |      |              | 1               | 5            | 22.44 | 22.26 | 22.66 | 0                   |
|            |              | 8               | 0            | 21.57 | 21.22 | 21.81 | 1                   |      |              | 3               | 0            | 21.49 | 21.10 | 21.73 | 0                   |
|            |              | 8               | 3            | 21.46 | 21.19 | 21.58 | 1                   |      |              | 3               | 1            | 21.37 | 21.06 | 21.51 | 0                   |
|            |              | 8               | 7            | 21.44 | 21.21 | 21.78 | 1                   |      |              | 3               | 3            | 21.33 | 21.08 | 21.69 | 0                   |
|            |              | 15              | 0            | 21.52 | 21.19 | 21.61 | 1                   |      |              | 6               | 0            | 21.43 | 21.06 | 21.53 | 1                   |
|            | 16QAM        | 1               | 0            | 21.85 | 21.37 | 21.90 | 1                   |      | 16QAM        | 1               | 0            | 21.80 | 21.32 | 21.85 | 1                   |
|            |              | 1               | 7            | 21.55 | 21.28 | 21.67 | 1                   |      |              | 1               | 2            | 21.49 | 21.20 | 21.60 | 1                   |
|            |              | 1               | 14           | 21.51 | 21.31 | 21.73 | 1                   |      |              | 1               | 5            | 21.46 | 21.22 | 21.69 | 1                   |
|            |              | 8               | 0            | 20.55 | 20.18 | 20.80 | 2                   |      |              | 3               | 0            | 20.46 | 20.05 | 20.71 | 1                   |
|            |              | 8               | 3            | 20.43 | 20.14 | 20.56 | 2                   |      |              | 3               | 1            | 20.33 | 20.05 | 20.48 | 1                   |
|            |              | 8               | 7            | 20.40 | 20.15 | 20.73 | 2                   |      |              | 3               | 3            | 20.30 | 20.02 | 20.67 | 1                   |
|            |              | 15              | 0            | 20.48 | 20.14 | 20.58 | 2                   |      |              | 6               | 0            | 20.39 | 19.99 | 20.51 | 2                   |

| LTE Band 26 |           |                 |           |       |       |       |               |     |           |                 |           |       |       |       |               |
|-------------|-----------|-----------------|-----------|-------|-------|-------|---------------|-----|-----------|-----------------|-----------|-------|-------|-------|---------------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  | 3GPP MPR (dB) | BW  | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  | 3GPP MPR (dB) |
|             |           | Channel         |           | 26765 | 26865 | 26965 |               |     |           | Channel         |           | 26740 | 26865 | 26990 |               |
|             |           | Frequency (MHz) |           | 821.5 | 831.5 | 841.5 |               |     |           | Frequency (MHz) |           | 819.0 | 831.5 | 844.0 |               |
| 15M         | QPSK      | 1               | 0         | 22.80 | 22.83 | 22.75 | 0             | 10M | QPSK      | 1               | 0         | 22.73 | 22.80 | 22.67 | 0             |
|             |           | 1               | 37        | 22.90 | 22.84 | 22.87 | 0             |     |           | 1               | 24        | 22.85 | 22.77 | 22.82 | 0             |
|             |           | 1               | 74        | 22.59 | 22.73 | 22.79 | 0             |     |           | 1               | 49        | 22.49 | 22.64 | 22.72 | 0             |
|             |           | 36              | 0         | 21.73 | 21.65 | 21.67 | 1             |     |           | 25              | 0         | 21.82 | 21.85 | 21.64 | 1             |
|             |           | 36              | 19        | 21.75 | 21.72 | 21.69 | 1             |     |           | 25              | 12        | 21.61 | 21.73 | 21.73 | 1             |
|             |           | 36              | 39        | 21.74 | 21.70 | 21.68 | 1             |     |           | 25              | 25        | 21.67 | 21.60 | 21.66 | 1             |
|             |           | 75              | 0         | 21.65 | 21.91 | 21.56 | 1             |     |           | 50              | 0         | 21.50 | 21.79 | 21.41 | 1             |
|             | 16QAM     | 1               | 0         | 21.84 | 21.96 | 21.78 | 1             |     | 16QAM     | 1               | 0         | 21.75 | 21.95 | 21.68 | 1             |
|             |           | 1               | 37        | 21.95 | 21.88 | 21.91 | 1             |     |           | 1               | 24        | 21.89 | 21.81 | 21.85 | 1             |
|             |           | 1               | 74        | 21.61 | 21.76 | 21.82 | 1             |     |           | 1               | 49        | 21.50 | 21.64 | 21.73 | 1             |
|             |           | 36              | 0         | 20.94 | 20.96 | 20.73 | 2             |     |           | 25              | 0         | 20.81 | 20.84 | 20.60 | 2             |
|             |           | 36              | 19        | 20.70 | 20.84 | 20.84 | 2             |     |           | 25              | 12        | 20.57 | 20.72 | 20.72 | 2             |
|             |           | 36              | 39        | 20.76 | 20.69 | 20.75 | 2             |     |           | 25              | 25        | 20.64 | 20.56 | 20.62 | 2             |
|             |           | 75              | 0         | 20.60 | 20.92 | 20.51 | 2             |     |           | 50              | 0         | 20.45 | 20.78 | 20.36 | 2             |
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  | 3GPP MPR (dB) | BW  | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  | 3GPP MPR (dB) |
|             |           | Channel         |           | 26715 | 26865 | 27015 |               |     |           | Channel         |           | 26705 | 26865 | 27025 |               |
|             |           | Frequency (MHz) |           | 816.5 | 831.5 | 846.5 |               |     |           | Frequency (MHz) |           | 815.5 | 831.5 | 847.5 |               |
| 5M          | QPSK      | 1               | 0         | 22.68 | 22.85 | 22.60 | 0             | 3M  | QPSK      | 1               | 0         | 22.60 | 22.80 | 22.51 | 0             |
|             |           | 1               | 12        | 22.79 | 22.72 | 22.76 | 0             |     |           | 1               | 7         | 22.75 | 22.66 | 22.69 | 0             |
|             |           | 1               | 24        | 22.42 | 22.57 | 22.66 | 0             |     |           | 1               | 14        | 22.33 | 22.48 | 22.55 | 0             |
|             |           | 12              | 0         | 21.71 | 21.76 | 21.50 | 1             |     |           | 8               | 0         | 21.65 | 21.68 | 21.41 | 1             |
|             |           | 12              | 6         | 21.46 | 21.62 | 21.62 | 1             |     |           | 8               | 3         | 21.38 | 21.55 | 21.55 | 1             |
|             |           | 12              | 13        | 21.53 | 21.45 | 21.52 | 1             |     |           | 8               | 7         | 21.47 | 21.35 | 21.44 | 1             |
|             |           | 25              | 0         | 21.35 | 21.69 | 21.26 | 1             |     |           | 15              | 0         | 21.21 | 21.61 | 21.12 | 1             |
|             | 16QAM     | 1               | 0         | 21.69 | 21.89 | 21.62 | 1             |     | 16QAM     | 1               | 0         | 21.64 | 21.85 | 21.55 | 1             |
|             |           | 1               | 12        | 21.84 | 21.74 | 21.78 | 1             |     |           | 1               | 7         | 21.79 | 21.71 | 21.76 | 1             |
|             |           | 1               | 24        | 21.42 | 21.57 | 21.67 | 1             |     |           | 1               | 14        | 21.34 | 21.51 | 21.61 | 1             |
|             |           | 12              | 0         | 20.72 | 20.77 | 20.47 | 2             |     |           | 8               | 0         | 20.63 | 20.69 | 20.38 | 2             |
|             |           | 12              | 6         | 20.44 | 20.62 | 20.62 | 2             |     |           | 8               | 3         | 20.34 | 20.53 | 20.53 | 2             |
|             |           | 12              | 13        | 20.53 | 20.41 | 20.50 | 2             |     |           | 8               | 7         | 20.43 | 20.28 | 20.42 | 2             |
|             |           | 25              | 0         | 20.30 | 20.69 | 20.21 | 2             |     |           | 15              | 0         | 20.17 | 20.60 | 20.06 | 2             |
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  | 3GPP MPR (dB) |     |           |                 |           |       |       |       |               |
|             |           | Channel         |           | 26697 | 26865 | 27033 |               |     |           |                 |           |       |       |       |               |
|             |           | Frequency (MHz) |           | 814.7 | 831.5 | 848.3 |               |     |           |                 |           |       |       |       |               |
| 1.4M        | QPSK      | 1               | 0         | 22.55 | 22.75 | 22.48 | 0             |     |           |                 |           |       |       |       |               |
|             |           | 1               | 2         | 22.68 | 22.61 | 22.64 | 0             |     |           |                 |           |       |       |       |               |
|             |           | 1               | 5         | 22.28 | 22.44 | 22.53 | 0             |     |           |                 |           |       |       |       |               |
|             |           | 3               | 0         | 21.56 | 21.60 | 21.28 | 0             |     |           |                 |           |       |       |       |               |
|             |           | 3               | 1         | 21.23 | 21.44 | 21.44 | 0             |     |           |                 |           |       |       |       |               |
|             |           | 3               | 3         | 21.33 | 21.19 | 21.29 | 0             |     |           |                 |           |       |       |       |               |
|             |           | 6               | 0         | 21.07 | 21.53 | 20.96 | 1             |     |           |                 |           |       |       |       |               |
|             | 16QAM     | 1               | 0         | 21.58 | 21.80 | 21.48 | 1             |     |           |                 |           |       |       |       |               |
|             |           | 1               | 2         | 21.74 | 21.63 | 21.70 | 1             |     |           |                 |           |       |       |       |               |
|             |           | 1               | 5         | 21.28 | 21.43 | 21.57 | 1             |     |           |                 |           |       |       |       |               |
|             |           | 3               | 0         | 20.55 | 20.61 | 20.25 | 1             |     |           |                 |           |       |       |       |               |
|             |           | 3               | 1         | 20.17 | 20.41 | 20.41 | 1             |     |           |                 |           |       |       |       |               |
|             |           | 3               | 3         | 20.30 | 20.12 | 20.26 | 1             |     |           |                 |           |       |       |       |               |
|             |           | 6               | 0         | 20.02 | 20.51 | 19.91 | 2             |     |           |                 |           |       |       |       |               |

# ERP Power (dBm)

| WCDMA |         |                 |           |                        |           |          |                    |
|-------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z     | 4132    | 826.4           | -13.48    | 31.208                 | 15.58     | 36.12    | H                  |
|       | 4182    | 836.4           | -13.65    | 31.3                   | 15.50     | 35.48    |                    |
|       | 4233    | 846.6           | -13.54    | 31.222                 | 15.53     | 35.74    |                    |
|       | 4132    | 826.4           | -17.82    | 31.504                 | 11.53     | 14.24    | V                  |
|       | 4182    | 836.4           | -17.42    | 31.117                 | 11.55     | 14.28    |                    |
|       | 4233    | 846.6           | -18.30    | 31.922                 | 11.47     | 14.03    |                    |

| LTE Band 5                         |         |                 |           |                        |           |          |                    |
|------------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4 MHz / QPSK  |         |                 |           |                        |           |          |                    |
| Plane                              | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z                                  | 20407   | 824.7           | -14.04    | 31.208                 | 15.02     | 31.75    | H                  |
|                                    | 20525   | 836.5           | -14.11    | 31.3                   | 15.04     | 31.92    |                    |
|                                    | 20643   | 848.3           | -14.03    | 31.222                 | 15.04     | 31.93    |                    |
|                                    | 20407   | 824.7           | -18.33    | 31.504                 | 11.02     | 12.66    | V                  |
|                                    | 20525   | 836.5           | -18.00    | 31.117                 | 10.97     | 12.49    |                    |
|                                    | 20643   | 848.3           | -18.77    | 31.922                 | 11.00     | 12.60    |                    |
| Channel Bandwidth: 1.4 MHz / 16QAM |         |                 |           |                        |           |          |                    |
| Z                                  | 20407   | 824.7           | -15.06    | 31.208                 | 14.00     | 25.11    | H                  |
|                                    | 20525   | 836.5           | -15.12    | 31.3                   | 14.03     | 25.29    |                    |
|                                    | 20643   | 848.3           | -15.05    | 31.222                 | 14.02     | 25.25    |                    |
|                                    | 20407   | 824.7           | -19.31    | 31.504                 | 10.04     | 10.10    | V                  |
|                                    | 20525   | 836.5           | -18.99    | 31.117                 | 9.98      | 9.95     |                    |
|                                    | 20643   | 848.3           | -19.80    | 31.922                 | 9.97      | 9.94     |                    |

| LTE Band 5                       |         |                 |           |                        |           |          |                    |
|----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 3 MHz / QPSK  |         |                 |           |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z                                | 20415   | 825.5           | -14.02    | 31.208                 | 15.04     | 31.90    | H                  |
|                                  | 20525   | 836.5           | -14.10    | 31.3                   | 15.05     | 31.99    |                    |
|                                  | 20635   | 847.5           | -14.06    | 31.222                 | 15.01     | 31.71    |                    |
|                                  | 20415   | 825.5           | -18.33    | 31.504                 | 11.02     | 12.66    | V                  |
|                                  | 20525   | 836.5           | -17.93    | 31.117                 | 11.04     | 12.70    |                    |
|                                  | 20635   | 847.5           | -18.76    | 31.922                 | 11.01     | 12.62    |                    |
| Channel Bandwidth: 3 MHz / 16QAM |         |                 |           |                        |           |          |                    |
| Z                                | 20415   | 825.5           | -15.01    | 31.208                 | 14.05     | 25.40    | H                  |
|                                  | 20525   | 836.5           | -15.12    | 31.3                   | 14.03     | 25.29    |                    |
|                                  | 20635   | 847.5           | -15.06    | 31.222                 | 14.01     | 25.19    |                    |
|                                  | 20415   | 825.5           | -19.31    | 31.504                 | 10.04     | 10.10    | V                  |
|                                  | 20525   | 836.5           | -18.95    | 31.117                 | 10.02     | 10.04    |                    |
|                                  | 20635   | 847.5           | -19.75    | 31.922                 | 10.02     | 10.05    |                    |

| LTE Band 5                       |         |                 |           |                        |           |          |                    |
|----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5 MHz / QPSK  |         |                 |           |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z                                | 20425   | 826.5           | -14.02    | 31.208                 | 15.04     | 31.90    | H                  |
|                                  | 20525   | 836.5           | -14.12    | 31.3                   | 15.03     | 31.84    |                    |
|                                  | 20625   | 846.5           | -14.06    | 31.222                 | 15.01     | 31.71    |                    |
|                                  | 20425   | 826.5           | -18.32    | 31.504                 | 11.03     | 12.69    | V                  |
|                                  | 20525   | 836.5           | -17.92    | 31.117                 | 11.05     | 12.73    |                    |
|                                  | 20625   | 846.5           | -18.73    | 31.922                 | 11.04     | 12.71    |                    |
| Channel Bandwidth: 5 MHz / 16QAM |         |                 |           |                        |           |          |                    |
| Z                                | 20425   | 826.5           | -15.03    | 31.208                 | 14.03     | 25.28    | H                  |
|                                  | 20525   | 836.5           | -15.11    | 31.3                   | 14.04     | 25.35    |                    |
|                                  | 20625   | 846.5           | -15.08    | 31.222                 | 13.99     | 25.06    |                    |
|                                  | 20425   | 826.5           | -19.31    | 31.504                 | 10.04     | 10.10    | V                  |
|                                  | 20525   | 836.5           | -18.95    | 31.117                 | 10.02     | 10.04    |                    |
|                                  | 20625   | 846.5           | -19.77    | 31.922                 | 10.00     | 10.00    |                    |

| LTE Band 5                        |         |                 |           |                        |           |          |                    |
|-----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10 MHz / QPSK  |         |                 |           |                        |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z                                 | 20450   | 829.0           | -13.95    | 31.208                 | 15.11     | 32.42    | H                  |
|                                   | 20525   | 836.5           | -14.02    | 31.3                   | 15.13     | 32.58    |                    |
|                                   | 20600   | 844.0           | -14.01    | 31.222                 | 15.06     | 32.08    |                    |
|                                   | 20450   | 829.0           | -18.23    | 31.504                 | 11.12     | 12.95    | V                  |
|                                   | 20525   | 836.5           | -17.81    | 31.117                 | 11.16     | 13.05    |                    |
|                                   | 20600   | 844.0           | -18.70    | 31.922                 | 11.07     | 12.80    |                    |
| Channel Bandwidth: 10 MHz / 16QAM |         |                 |           |                        |           |          |                    |
| Z                                 | 20425   | 826.5           | -14.98    | 31.208                 | 14.08     | 25.57    | H                  |
|                                   | 20525   | 836.5           | -15.04    | 31.3                   | 14.11     | 25.76    |                    |
|                                   | 20625   | 846.5           | -15.03    | 31.222                 | 14.04     | 25.36    |                    |
|                                   | 20425   | 826.5           | -19.22    | 31.504                 | 10.13     | 10.31    | V                  |
|                                   | 20525   | 836.5           | -18.83    | 31.117                 | 10.14     | 10.32    |                    |
|                                   | 20625   | 846.5           | -19.71    | 31.922                 | 10.06     | 10.14    |                    |

| LTE Band 26                        |         |                 |           |                        |           |          |                    |
|------------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4 MHz / QPSK  |         |                 |           |                        |           |          |                    |
| Plane                              | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z                                  | 26797   | 824.7           | -14.02    | 31.208                 | 15.04     | 31.90    | H                  |
|                                    | 26915   | 836.5           | -14.08    | 31.3                   | 15.07     | 32.14    |                    |
|                                    | 27033   | 848.3           | -14.04    | 31.222                 | 15.03     | 31.86    |                    |
|                                    | 26797   | 824.7           | -18.32    | 31.504                 | 11.03     | 12.69    | V                  |
|                                    | 26915   | 836.5           | -17.92    | 31.117                 | 11.05     | 12.73    |                    |
|                                    | 27033   | 848.3           | -18.73    | 31.922                 | 11.04     | 12.71    |                    |
| Channel Bandwidth: 1.4 MHz / 16QAM |         |                 |           |                        |           |          |                    |
| Z                                  | 26797   | 824.7           | -15.04    | 31.208                 | 14.02     | 25.22    | H                  |
|                                    | 26915   | 836.5           | -15.10    | 31.3                   | 14.05     | 25.41    |                    |
|                                    | 27033   | 848.3           | -15.06    | 31.222                 | 14.01     | 25.19    |                    |
|                                    | 26797   | 824.7           | -19.36    | 31.504                 | 9.99      | 9.99     | V                  |
|                                    | 26915   | 836.5           | -18.95    | 31.117                 | 10.02     | 10.04    |                    |
|                                    | 27033   | 848.3           | -19.75    | 31.922                 | 10.02     | 10.05    |                    |

| LTE Band 26                      |         |                 |           |                        |           |          |                    |
|----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 3 MHz / QPSK  |         |                 |           |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z                                | 26805   | 825.5           | -14.02    | 31.208                 | 15.04     | 31.90    | H                  |
|                                  | 26915   | 836.5           | -14.10    | 31.3                   | 15.05     | 31.99    |                    |
|                                  | 27025   | 847.5           | -14.02    | 31.222                 | 15.05     | 32.00    |                    |
|                                  | 26805   | 825.5           | -18.30    | 31.504                 | 11.05     | 12.75    | V                  |
|                                  | 26915   | 836.5           | -17.94    | 31.117                 | 11.03     | 12.67    |                    |
|                                  | 27025   | 847.5           | -18.77    | 31.922                 | 11.00     | 12.60    |                    |
| Channel Bandwidth: 3 MHz / 16QAM |         |                 |           |                        |           |          |                    |
| Z                                | 26805   | 825.5           | -15.01    | 31.208                 | 14.05     | 25.40    | H                  |
|                                  | 26915   | 836.5           | -15.12    | 31.3                   | 14.03     | 25.29    |                    |
|                                  | 27025   | 847.5           | -15.06    | 31.222                 | 14.01     | 25.19    |                    |
|                                  | 26805   | 825.5           | -19.32    | 31.504                 | 10.03     | 10.08    | V                  |
|                                  | 26915   | 836.5           | -18.95    | 31.117                 | 10.02     | 10.04    |                    |
|                                  | 27025   | 847.5           | -19.78    | 31.922                 | 9.99      | 9.98     |                    |

| LTE Band 26                      |         |                 |           |                        |           |          |                    |
|----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5 MHz / QPSK  |         |                 |           |                        |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z                                | 26815   | 826.5           | -14.01    | 31.208                 | 15.05     | 31.97    | H                  |
|                                  | 26915   | 836.5           | -14.06    | 31.3                   | 15.09     | 32.28    |                    |
|                                  | 27015   | 846.5           | -14.03    | 31.222                 | 15.04     | 31.93    |                    |
|                                  | 26815   | 826.5           | -18.33    | 31.504                 | 11.02     | 12.66    | V                  |
|                                  | 26919   | 836.5           | -17.92    | 31.117                 | 11.05     | 12.73    |                    |
|                                  | 27015   | 846.5           | -18.75    | 31.922                 | 11.02     | 12.65    |                    |
| Channel Bandwidth: 5 MHz / 16QAM |         |                 |           |                        |           |          |                    |
| Z                                | 26815   | 826.5           | -15.00    | 31.208                 | 14.06     | 25.46    | H                  |
|                                  | 26915   | 836.5           | -15.04    | 31.3                   | 14.11     | 25.76    |                    |
|                                  | 27015   | 846.5           | -15.06    | 31.222                 | 14.01     | 25.19    |                    |
|                                  | 26815   | 826.5           | -19.30    | 31.504                 | 10.05     | 10.13    | V                  |
|                                  | 26919   | 836.5           | -18.90    | 31.117                 | 10.07     | 10.16    |                    |
|                                  | 27015   | 846.5           | -19.71    | 31.922                 | 10.06     | 10.14    |                    |

| LTE Band 26                       |         |                 |           |                        |           |          |                    |
|-----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10 MHz / QPSK  |         |                 |           |                        |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z                                 | 26840   | 829.0           | -14.00    | 31.208                 | 15.06     | 32.05    | H                  |
|                                   | 26915   | 836.5           | -14.02    | 31.3                   | 15.13     | 32.58    |                    |
|                                   | 26990   | 844.0           | -14.00    | 31.222                 | 15.07     | 32.15    |                    |
|                                   | 26840   | 829.0           | -18.26    | 31.504                 | 11.09     | 12.86    | V                  |
|                                   | 26919   | 836.5           | -17.85    | 31.117                 | 11.12     | 12.93    |                    |
|                                   | 26990   | 844.0           | -18.71    | 31.922                 | 11.06     | 12.77    |                    |
| Channel Bandwidth: 10 MHz / 16QAM |         |                 |           |                        |           |          |                    |
| Z                                 | 26840   | 829.0           | -14.96    | 31.208                 | 14.10     | 25.69    | H                  |
|                                   | 26915   | 836.5           | -15.00    | 31.3                   | 14.15     | 26.00    |                    |
|                                   | 26990   | 844.0           | -14.98    | 31.222                 | 14.09     | 25.66    |                    |
|                                   | 26840   | 829.0           | -19.25    | 31.504                 | 10.10     | 10.24    | V                  |
|                                   | 26919   | 836.5           | -18.82    | 31.117                 | 10.15     | 10.34    |                    |
|                                   | 26990   | 844.0           | -19.70    | 31.922                 | 10.07     | 10.17    |                    |

| LTE Band 26                       |         |                 |           |                        |           |          |                    |
|-----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 15 MHz / QPSK  |         |                 |           |                        |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Z                                 | 26865   | 831.5           | -13.92    | 31.208                 | 15.14     | 32.64    | H                  |
|                                   | 26915   | 836.5           | -13.99    | 31.3                   | 15.16     | 32.81    |                    |
|                                   | 26965   | 841.5           | -13.98    | 31.222                 | 15.09     | 32.30    |                    |
|                                   | 26865   | 831.5           | -18.20    | 31.504                 | 11.15     | 13.04    | V                  |
|                                   | 26915   | 836.5           | -17.78    | 31.117                 | 11.19     | 13.14    |                    |
|                                   | 26965   | 841.5           | -18.68    | 31.922                 | 11.09     | 12.86    |                    |
| Channel Bandwidth: 15 MHz / 16QAM |         |                 |           |                        |           |          |                    |
| Z                                 | 26865   | 831.5           | -14.90    | 31.208                 | 14.16     | 26.05    | H                  |
|                                   | 26915   | 836.5           | -14.96    | 31.3                   | 14.19     | 26.24    |                    |
|                                   | 26965   | 841.5           | -14.92    | 31.222                 | 14.15     | 26.01    |                    |
|                                   | 26865   | 831.5           | -19.15    | 31.504                 | 10.20     | 10.48    | V                  |
|                                   | 26915   | 836.5           | -18.75    | 31.117                 | 10.22     | 10.51    |                    |
|                                   | 26965   | 841.5           | -19.66    | 31.922                 | 10.11     | 10.26    |                    |

## 4.2 Frequency Stability Measurement

### 4.2.1 Limits of Frequency Stability Measurement

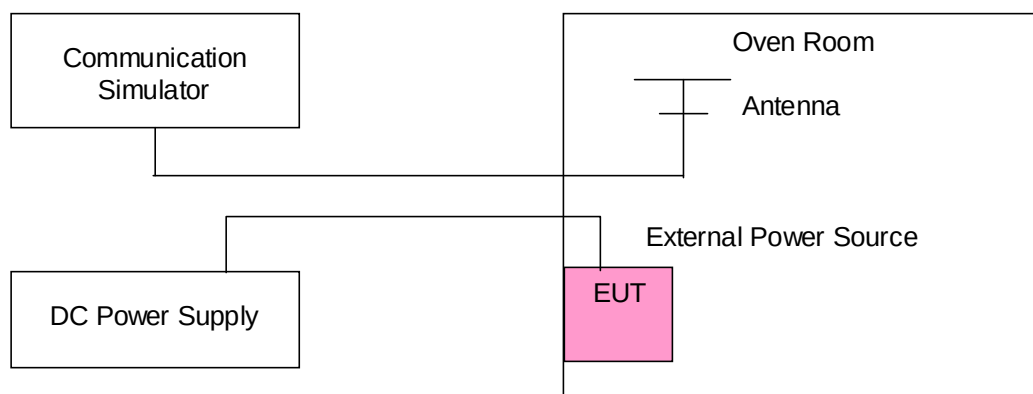
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

### 4.2.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5$  °C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**NOTE:** The frequency error was recorded frequency error from the communication simulator.

### 4.2.3 Test Setup



#### 4.2.4 Test Results

##### Frequency Error vs. Voltage

| Voltage<br>(Volts) | WCDMA           |                       |                 |                       | Limit (ppm) |
|--------------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Low Channel     |                       | High Channel    |                       |             |
|                    | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 826.400004      | 0.004                 | 846.600002      | 0.002                 | 2.5         |
| 6.54               | 826.400002      | 0.003                 | 846.600001      | 0.002                 | 2.5         |
| 8.85               | 826.400001      | 0.001                 | 846.600004      | 0.004                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

##### Frequency Error vs. Temperature

| Temp. (°C) | WCDMA           |                       |                 |                       | Limit (ppm) |
|------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|            | Low Channel     |                       | High Channel    |                       |             |
|            | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 826.400001      | 0.001                 | 846.600003      | 0.004                 | 2.5         |
| -20        | 826.400003      | 0.004                 | 846.600004      | 0.004                 | 2.5         |
| -10        | 826.400003      | 0.003                 | 846.600001      | 0.001                 | 2.5         |
| 0          | 826.400004      | 0.005                 | 846.600004      | 0.004                 | 2.5         |
| 10         | 826.400003      | 0.003                 | 846.600001      | 0.001                 | 2.5         |
| 20         | 826.399998      | -0.002                | 846.599998      | -0.002                | 2.5         |
| 30         | 826.399998      | -0.003                | 846.599997      | -0.003                | 2.5         |
| 40         | 826.399997      | -0.004                | 846.599996      | -0.005                | 2.5         |
| 50         | 826.399999      | -0.001                | 846.599996      | -0.004                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 5                 |                       |                 |                       | Limit (ppm) |
|--------------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|                    | Low Channel                |                       | High Channel    |                       |             |
|                    | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 824.700004                 | 0.005                 | 848.300003      | 0.004                 | 2.5         |
| 6.54               | 824.700002                 | 0.003                 | 848.300004      | 0.004                 | 2.5         |
| 8.85               | 824.700004                 | 0.005                 | 848.300004      | 0.004                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 5                 |                       |                 |                       | Limit (ppm) |
|------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|            | Low Channel                |                       | High Channel    |                       |             |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 824.700003                 | 0.003                 | 848.300001      | 0.002                 | 2.5         |
| -20        | 824.700002                 | 0.002                 | 848.300002      | 0.003                 | 2.5         |
| -10        | 824.700002                 | 0.003                 | 848.300003      | 0.004                 | 2.5         |
| 0          | 824.700002                 | 0.002                 | 848.300002      | 0.002                 | 2.5         |
| 10         | 824.700002                 | 0.002                 | 848.300002      | 0.002                 | 2.5         |
| 20         | 824.699997                 | -0.004                | 848.299997      | -0.004                | 2.5         |
| 30         | 824.699999                 | -0.001                | 848.299998      | -0.003                | 2.5         |
| 40         | 824.699996                 | -0.005                | 848.299997      | -0.003                | 2.5         |
| 50         | 824.699999                 | -0.001                | 848.299998      | -0.003                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 5               |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 825.500002               | 0.003                 | 847.500001      | 0.001                 | 2.5         |
| 6.54               | 825.500002               | 0.003                 | 847.500002      | 0.002                 | 2.5         |
| 8.85               | 825.500002               | 0.002                 | 847.500002      | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 5               |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 825.500003               | 0.003                 | 847.500003      | 0.004                 | 2.5         |
| -20        | 825.500003               | 0.004                 | 847.500002      | 0.002                 | 2.5         |
| -10        | 825.500001               | 0.002                 | 847.500003      | 0.004                 | 2.5         |
| 0          | 825.500002               | 0.002                 | 847.500003      | 0.003                 | 2.5         |
| 10         | 825.500003               | 0.004                 | 847.500001      | 0.001                 | 2.5         |
| 20         | 825.499998               | -0.003                | 847.499998      | -0.002                | 2.5         |
| 30         | 825.499999               | -0.001                | 847.499998      | -0.002                | 2.5         |
| 40         | 825.499998               | -0.003                | 847.499998      | -0.002                | 2.5         |
| 50         | 825.499998               | -0.002                | 847.499997      | -0.004                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 5               |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 826.500002               | 0.003                 | 846.500003      | 0.003                 | 2.5         |
| 6.54               | 826.500001               | 0.002                 | 846.500004      | 0.005                 | 2.5         |
| 8.85               | 826.500002               | 0.003                 | 846.500003      | 0.004                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 5               |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 826.500001               | 0.001                 | 846.500003      | 0.003                 | 2.5         |
| -20        | 826.500001               | 0.001                 | 846.500002      | 0.002                 | 2.5         |
| -10        | 826.500003               | 0.004                 | 846.500003      | 0.004                 | 2.5         |
| 0          | 826.500004               | 0.005                 | 846.500003      | 0.004                 | 2.5         |
| 10         | 826.500003               | 0.004                 | 846.500002      | 0.002                 | 2.5         |
| 20         | 826.499997               | -0.004                | 846.499997      | -0.003                | 2.5         |
| 30         | 826.499997               | -0.004                | 846.499999      | -0.002                | 2.5         |
| 40         | 826.499999               | -0.002                | 846.499997      | -0.004                | 2.5         |
| 50         | 826.499998               | -0.002                | 846.499998      | -0.002                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 5                |                       |                 |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 10 MHz |                       |                 |                       |             |
|                    | Low Channel               |                       | High Channel    |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 829.000004                | 0.005                 | 844.000002      | 0.002                 | 2.5         |
| 6.54               | 829.000004                | 0.005                 | 844.000004      | 0.004                 | 2.5         |
| 8.85               | 829.000003                | 0.004                 | 844.000002      | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 5                |                       |                 |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |             |
|            | Low Channel               |                       | High Channel    |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 829.000004                | 0.004                 | 844.000002      | 0.003                 | 2.5         |
| -20        | 829.000001                | 0.001                 | 844.000001      | 0.002                 | 2.5         |
| -10        | 829.000004                | 0.004                 | 844.000001      | 0.001                 | 2.5         |
| 0          | 829.000002                | 0.003                 | 844.000002      | 0.002                 | 2.5         |
| 10         | 829.000004                | 0.004                 | 844.000003      | 0.004                 | 2.5         |
| 20         | 828.999997                | -0.004                | 843.999999      | -0.001                | 2.5         |
| 30         | 828.999999                | -0.001                | 843.999997      | -0.003                | 2.5         |
| 40         | 828.999999                | -0.001                | 843.999999      | -0.001                | 2.5         |
| 50         | 828.999998                | -0.003                | 843.999997      | -0.004                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 26                |                       |                 |                       | Limit (ppm) |
|--------------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|                    | Low Channel                |                       | High Channel    |                       |             |
|                    | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 824.700001                 | 0.001                 | 848.300001      | 0.002                 | 2.5         |
| 6.54               | 824.700003                 | 0.004                 | 848.300001      | 0.002                 | 2.5         |
| 8.85               | 824.700002                 | 0.003                 | 848.300003      | 0.003                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 26                |                       |                 |                       | Limit (ppm) |
|------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|            | Low Channel                |                       | High Channel    |                       |             |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 824.700003                 | 0.003                 | 848.300003      | 0.004                 | 2.5         |
| -20        | 824.700004                 | 0.004                 | 848.300002      | 0.003                 | 2.5         |
| -10        | 824.700001                 | 0.001                 | 848.300002      | 0.002                 | 2.5         |
| 0          | 824.700001                 | 0.002                 | 848.300003      | 0.004                 | 2.5         |
| 10         | 824.700003                 | 0.003                 | 848.300004      | 0.005                 | 2.5         |
| 20         | 824.699997                 | -0.004                | 848.299999      | -0.002                | 2.5         |
| 30         | 824.699996                 | -0.004                | 848.299997      | -0.004                | 2.5         |
| 40         | 824.699998                 | -0.002                | 848.299997      | -0.004                | 2.5         |
| 50         | 824.699996                 | -0.005                | 848.299996      | -0.004                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 26              |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 825.500004               | 0.004                 | 847.500004      | 0.005                 | 2.5         |
| 6.54               | 825.500003               | 0.003                 | 847.500003      | 0.003                 | 2.5         |
| 8.85               | 825.500004               | 0.005                 | 847.500004      | 0.004                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 26              |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 825.500004               | 0.004                 | 847.500004      | 0.004                 | 2.5         |
| -20        | 825.500003               | 0.003                 | 847.500004      | 0.004                 | 2.5         |
| -10        | 825.500004               | 0.004                 | 847.500003      | 0.004                 | 2.5         |
| 0          | 825.500003               | 0.004                 | 847.500003      | 0.003                 | 2.5         |
| 10         | 825.500003               | 0.004                 | 847.500003      | 0.003                 | 2.5         |
| 20         | 825.499996               | -0.005                | 847.499996      | -0.005                | 2.5         |
| 30         | 825.499996               | -0.005                | 847.499999      | -0.001                | 2.5         |
| 40         | 825.499998               | -0.002                | 847.499997      | -0.004                | 2.5         |
| 50         | 825.499998               | -0.003                | 847.499997      | -0.004                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 26              |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 826.500001               | 0.001                 | 846.500001      | 0.001                 | 2.5         |
| 6.54               | 826.500002               | 0.003                 | 846.500001      | 0.001                 | 2.5         |
| 8.85               | 826.500002               | 0.002                 | 846.500002      | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 26              |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 826.500002               | 0.002                 | 846.500004      | 0.005                 | 2.5         |
| -20        | 826.500004               | 0.004                 | 846.500003      | 0.004                 | 2.5         |
| -10        | 826.500003               | 0.004                 | 846.500002      | 0.002                 | 2.5         |
| 0          | 826.500004               | 0.004                 | 846.500001      | 0.001                 | 2.5         |
| 10         | 826.500002               | 0.002                 | 846.500002      | 0.003                 | 2.5         |
| 20         | 826.499999               | -0.002                | 846.499997      | -0.003                | 2.5         |
| 30         | 826.499998               | -0.002                | 846.499996      | -0.005                | 2.5         |
| 40         | 826.499997               | -0.004                | 846.499998      | -0.002                | 2.5         |
| 50         | 826.499999               | -0.001                | 846.499999      | -0.002                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 26               |                       |                 |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 10 MHz |                       |                 |                       |             |
|                    | Low Channel               |                       | High Channel    |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 829.000004                | 0.005                 | 844.000003      | 0.003                 | 2.5         |
| 6.54               | 829.000003                | 0.004                 | 844.000003      | 0.003                 | 2.5         |
| 8.85               | 829.000003                | 0.003                 | 844.000003      | 0.004                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 26               |                       |                 |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |             |
|            | Low Channel               |                       | High Channel    |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 829.000001                | 0.001                 | 844.000003      | 0.004                 | 2.5         |
| -20        | 829.000004                | 0.005                 | 844.000002      | 0.002                 | 2.5         |
| -10        | 829.000002                | 0.003                 | 844.000002      | 0.002                 | 2.5         |
| 0          | 829.000003                | 0.003                 | 844.000001      | 0.002                 | 2.5         |
| 10         | 829.000001                | 0.001                 | 844.000002      | 0.002                 | 2.5         |
| 20         | 828.999998                | -0.002                | 843.999996      | -0.005                | 2.5         |
| 30         | 828.999996                | -0.004                | 843.999996      | -0.004                | 2.5         |
| 40         | 828.999996                | -0.005                | 843.999997      | -0.004                | 2.5         |
| 50         | 828.999997                | -0.003                | 843.999997      | -0.003                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 26               |                       |                 |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 15 MHz |                       |                 |                       |             |
|                    | Low Channel               |                       | High Channel    |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 7.7                | 831.500004                | 0.004                 | 841.500003      | 0.004                 | 2.5         |
| 6.54               | 831.500001                | 0.001                 | 841.500001      | 0.002                 | 2.5         |
| 8.85               | 831.500002                | 0.003                 | 841.500001      | 0.001                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 6.54 Vdc to 8.85 Vdc.

### Frequency Error vs. Temperature

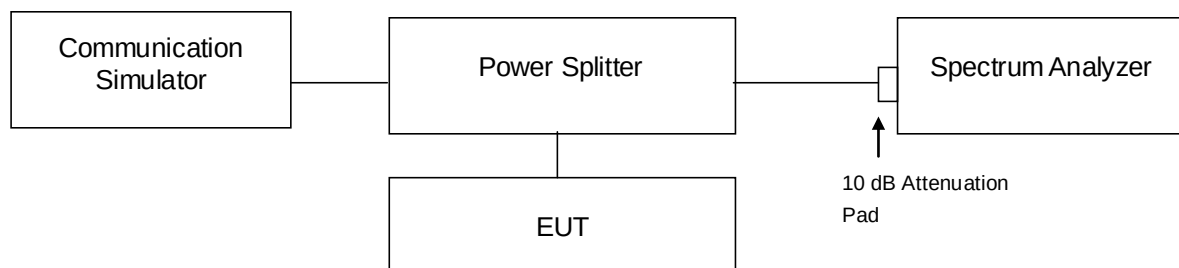
| Temp. (°C) | LTE Band 26               |                       |                 |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 15 MHz |                       |                 |                       |             |
|            | Low Channel               |                       | High Channel    |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 831.500003                | 0.003                 | 841.500001      | 0.001                 | 2.5         |
| -20        | 831.500002                | 0.003                 | 841.500003      | 0.004                 | 2.5         |
| -10        | 831.500004                | 0.005                 | 841.500002      | 0.003                 | 2.5         |
| 0          | 831.500003                | 0.004                 | 841.500003      | 0.004                 | 2.5         |
| 10         | 831.500003                | 0.004                 | 841.500003      | 0.004                 | 2.5         |
| 20         | 831.499997                | -0.003                | 841.499999      | -0.001                | 2.5         |
| 30         | 831.499997                | -0.004                | 841.499999      | -0.002                | 2.5         |
| 40         | 831.499997                | -0.004                | 841.499999      | -0.002                | 2.5         |
| 50         | 831.499997                | -0.004                | 841.499998      | -0.002                | 2.5         |

### 4.3 Occupied Bandwidth Measurement

#### 4.3.1 Test Procedure

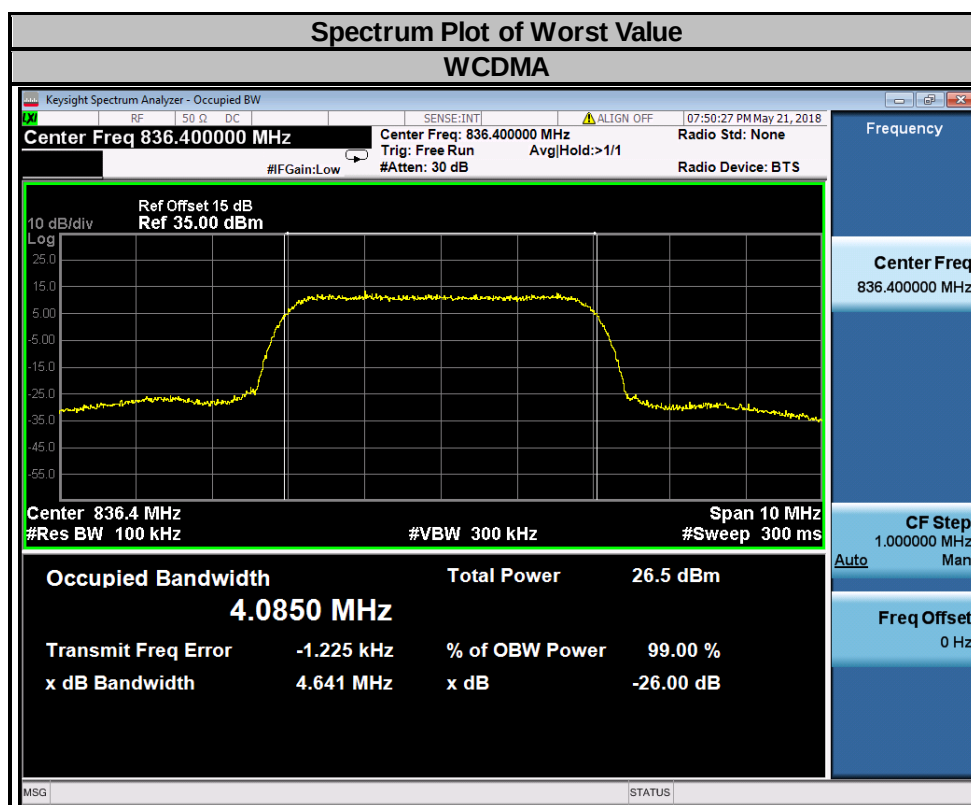
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

#### 4.3.2 Test Setup

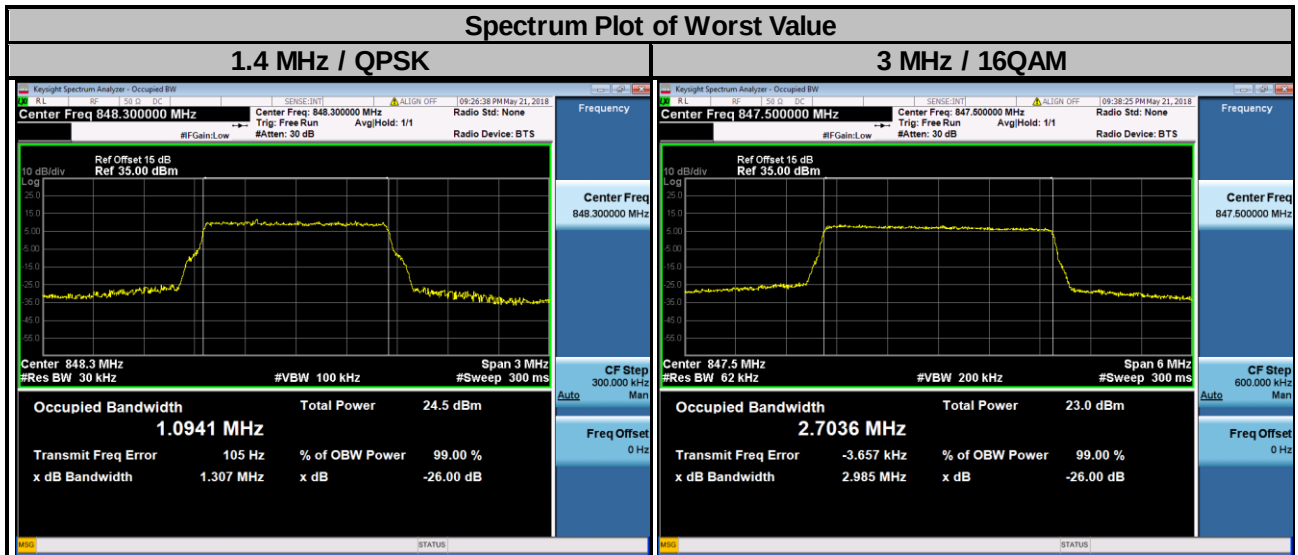


#### 4.3.3 Test Result

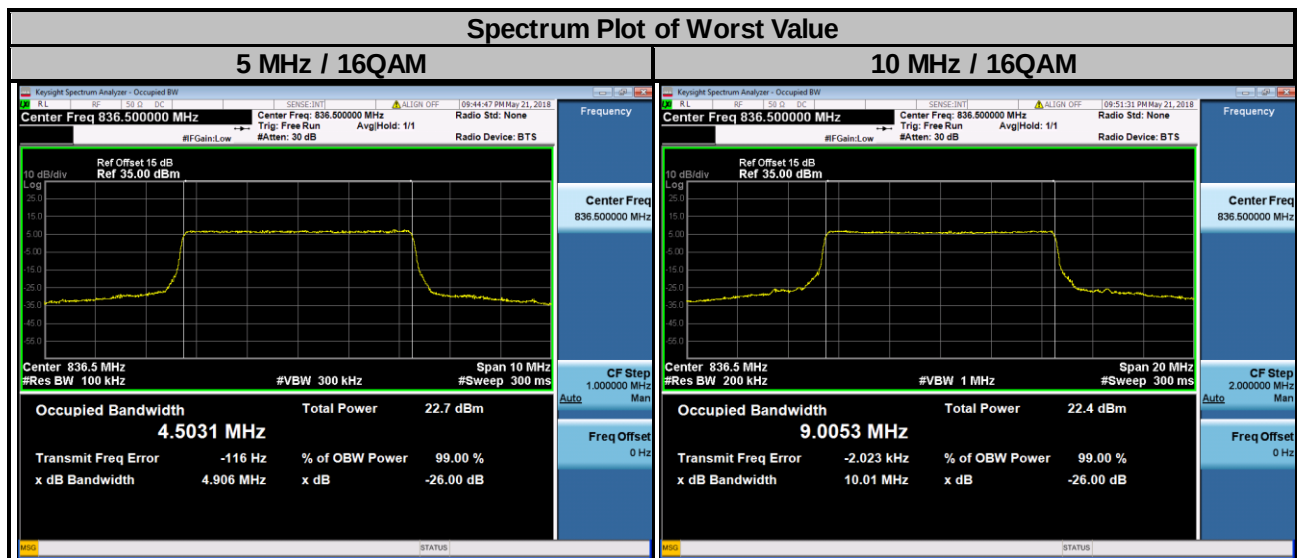
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |
|---------|-----------------|-------------------------------|
|         |                 | WCDMA                         |
| 4132    | 826.4           | 4.0691                        |
| 4182    | 836.4           | 4.0850                        |
| 4233    | 846.6           | 4.0750                        |



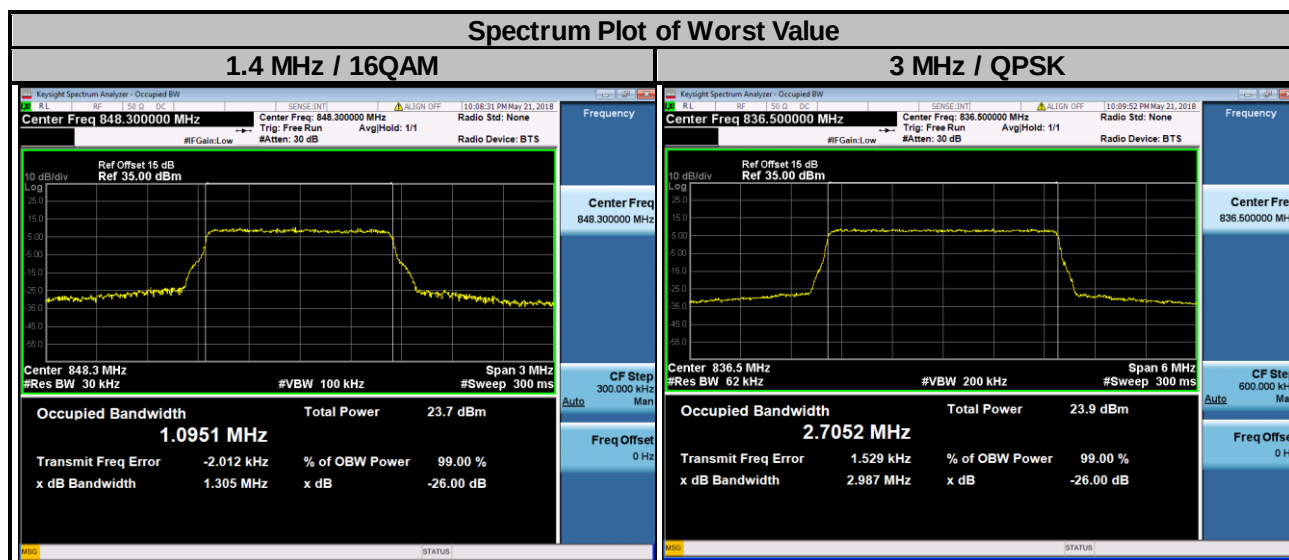
| LTE Band 5                 |                 |                               |        |                          |                 |                               |        |
|----------------------------|-----------------|-------------------------------|--------|--------------------------|-----------------|-------------------------------|--------|
| Channel Bandwidth: 1.4 MHz |                 |                               |        | Channel Bandwidth: 3 MHz |                 |                               |        |
| Channel                    | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        | Channel                  | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        |
|                            |                 | QPSK                          | 16QAM  |                          |                 | QPSK                          | 16QAM  |
| 20407                      | 824.7           | 1.0923                        | 1.0927 | 20415                    | 825.5           | 2.7007                        | 2.7031 |
| 20525                      | 836.5           | 1.0938                        | 1.0929 | 20525                    | 836.5           | 2.7040                        | 2.7019 |
| 20643                      | 848.3           | 1.0941                        | 1.0918 | 20635                    | 847.5           | 2.7031                        | 2.7036 |



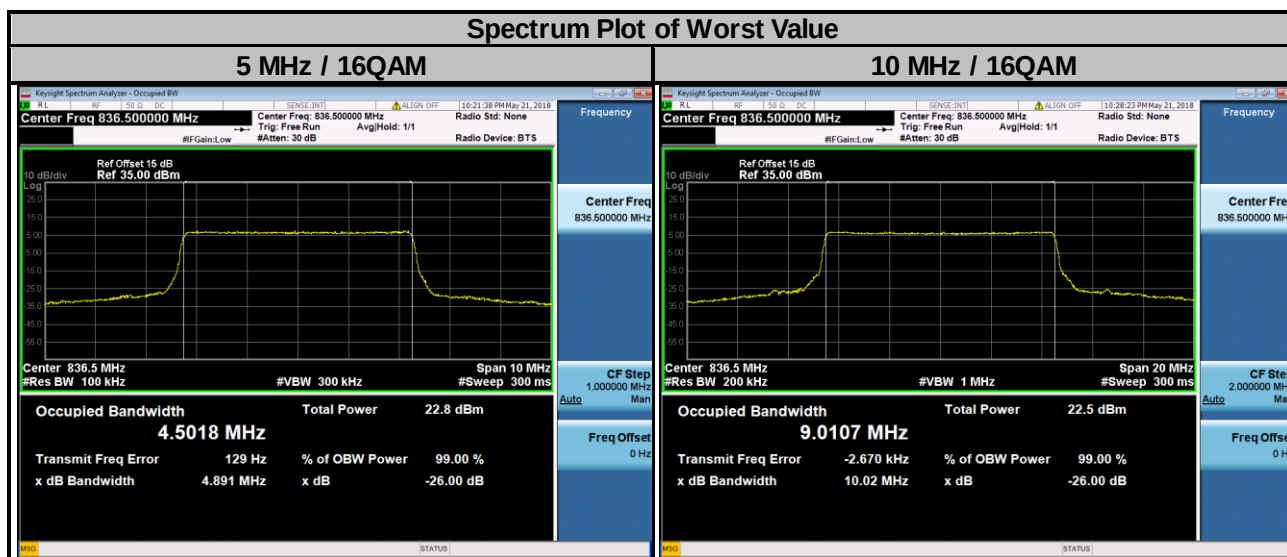
| LTE Band 5               |                 |                               |        |                           |                 |                               |        |
|--------------------------|-----------------|-------------------------------|--------|---------------------------|-----------------|-------------------------------|--------|
| Channel Bandwidth: 5 MHz |                 |                               |        | Channel Bandwidth: 10 MHz |                 |                               |        |
| Channel                  | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        | Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        |
|                          |                 | QPSK                          | 16QAM  |                           |                 | QPSK                          | 16QAM  |
| 20425                    | 826.5           | 4.4928                        | 4.4913 | 20450                     | 829.0           | 8.9586                        | 8.9570 |
| 20525                    | 836.5           | 4.4994                        | 4.5031 | 20525                     | 836.5           | 9.0043                        | 9.0053 |
| 20625                    | 846.5           | 4.4874                        | 4.4900 | 20600                     | 844.0           | 8.9512                        | 8.9504 |



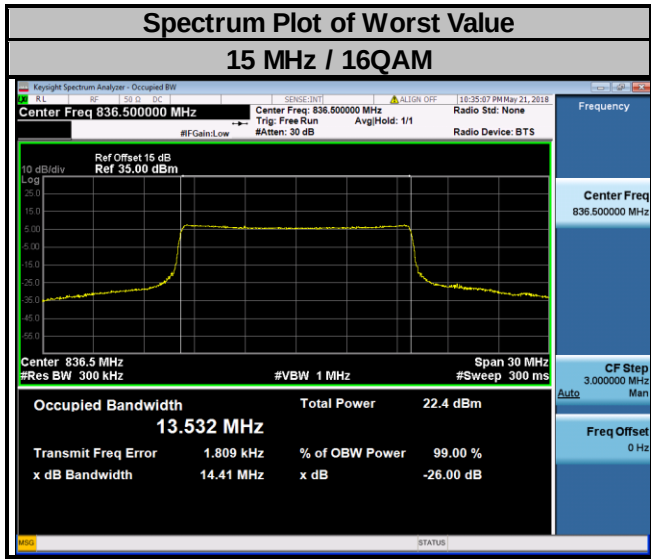
| LTE Band 26                |                 |                               |        |                          |                 |                               |        |
|----------------------------|-----------------|-------------------------------|--------|--------------------------|-----------------|-------------------------------|--------|
| Channel Bandwidth: 1.4 MHz |                 |                               |        | Channel Bandwidth: 3 MHz |                 |                               |        |
| Channel                    | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        | Channel                  | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        |
|                            |                 | QPSK                          | 16QAM  |                          |                 | QPSK                          | 16QAM  |
| 26797                      | 824.7           | 1.0914                        | 1.0939 | 26805                    | 825.5           | 2.7013                        | 2.7025 |
| 26915                      | 836.5           | 1.0914                        | 1.0910 | 26915                    | 836.5           | 2.7052                        | 2.7046 |
| 27033                      | 848.3           | 1.0921                        | 1.0951 | 27025                    | 847.5           | 2.7024                        | 2.7040 |



| LTE Band 26              |                 |                               |        |                           |                 |                               |        |
|--------------------------|-----------------|-------------------------------|--------|---------------------------|-----------------|-------------------------------|--------|
| Channel Bandwidth: 5 MHz |                 |                               |        | Channel Bandwidth: 10 MHz |                 |                               |        |
| Channel                  | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        | Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        |
|                          |                 | QPSK                          | 16QAM  |                           |                 | QPSK                          | 16QAM  |
| 26815                    | 826.5           | 4.4931                        | 4.4927 | 26840                     | 829.0           | 8.9668                        | 8.9613 |
| 26915                    | 836.5           | 4.5001                        | 4.5018 | 26915                     | 836.5           | 9.0099                        | 9.0107 |
| 27015                    | 846.5           | 4.4898                        | 4.4909 | 26990                     | 844.0           | 8.9514                        | 8.9481 |



| LTE Band 26               |                 |                               |        |
|---------------------------|-----------------|-------------------------------|--------|
| Channel Bandwidth: 15 MHz |                 |                               |        |
| Channel                   | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        |
|                           |                 | QPSK                          | 16QAM  |
| 26865                     | 831.5           | 13.452                        | 13.470 |
| 26915                     | 836.5           | 13.530                        | 13.532 |
| 26965                     | 841.5           | 13.427                        | 13.440 |

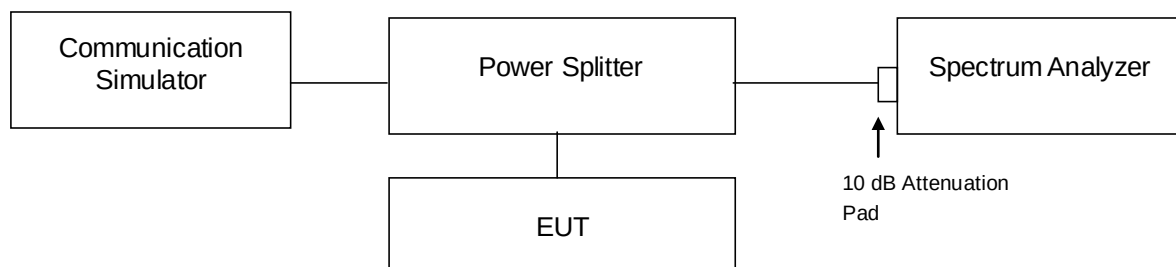


## 4.4 Band Edge Measurement

### 4.4.1 Limits of Band Edge Measurement

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

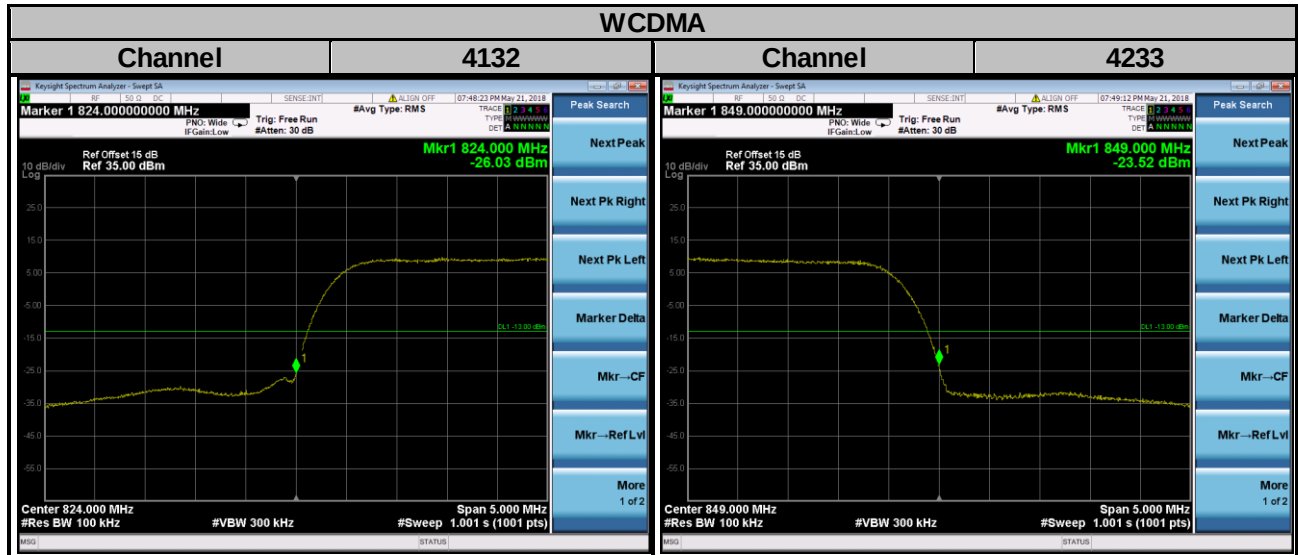
### 4.4.2 Test Setup



### 4.4.3 Test Procedures

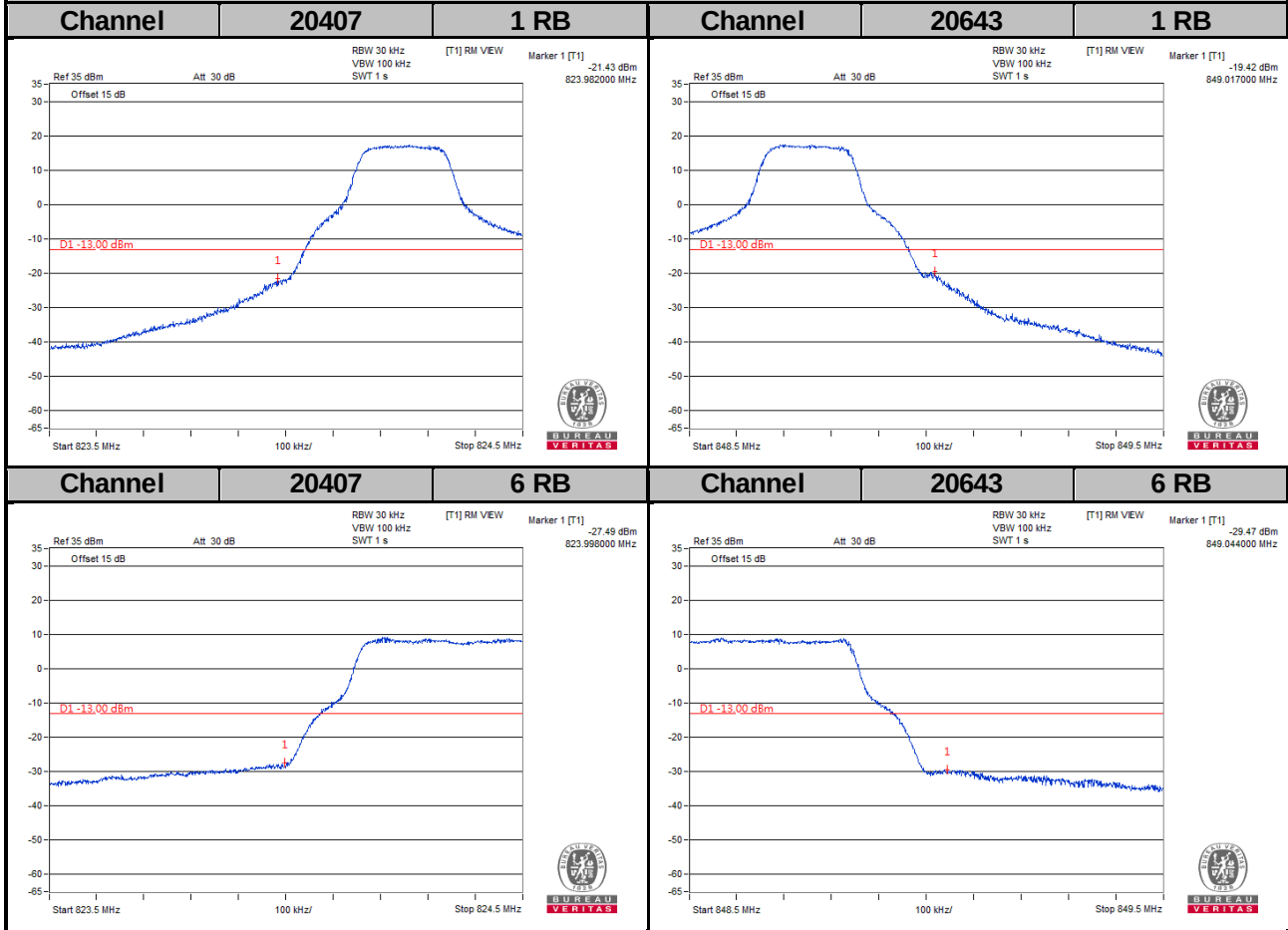
- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 1.4 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 51 kHz and VB of the spectrum is 150 kHz (LTE Bandwidth 5 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 10 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
- Record the max trace plot into the test report.

#### 4.4.4 Test Results



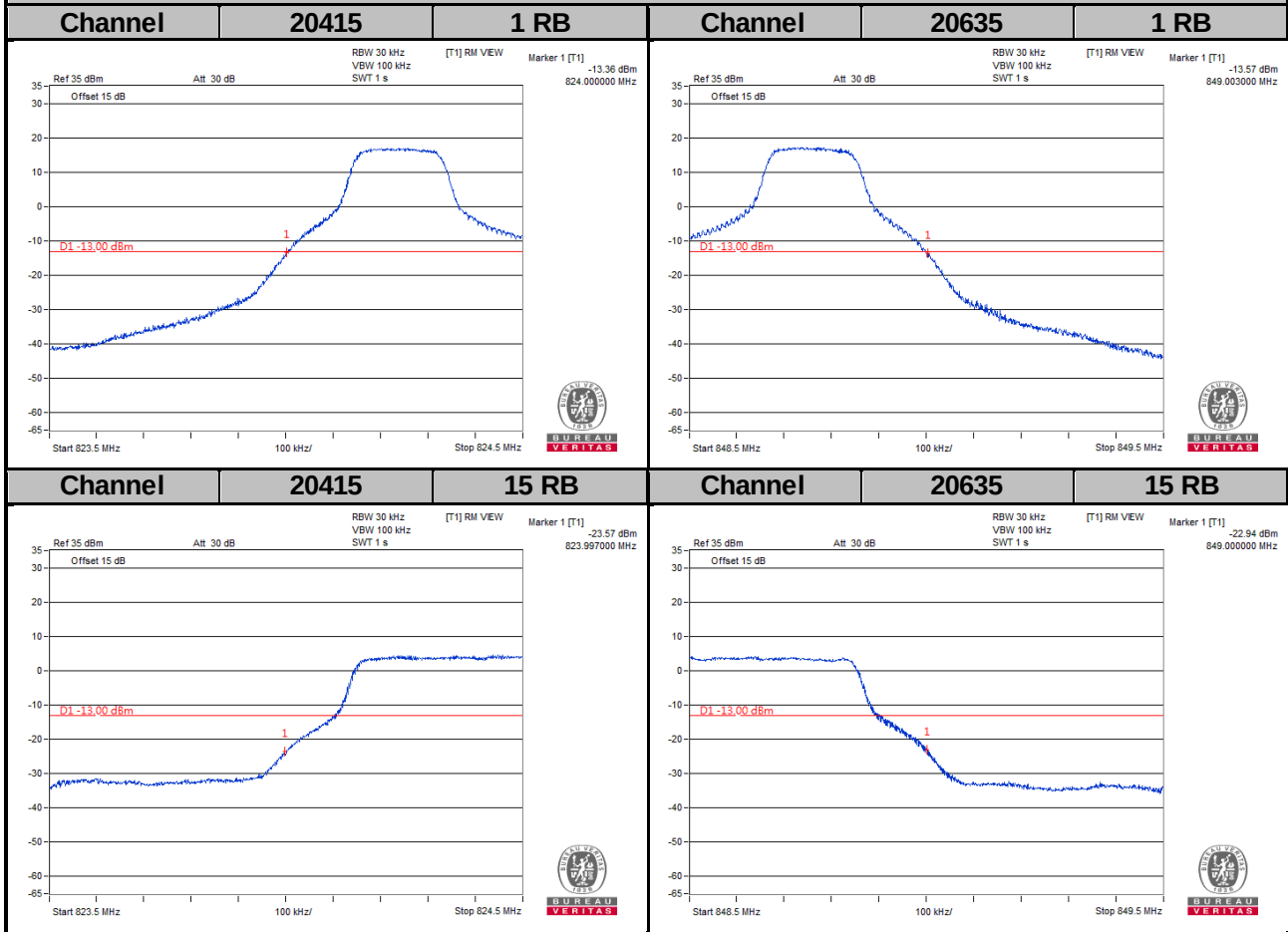
# LTE Band 5

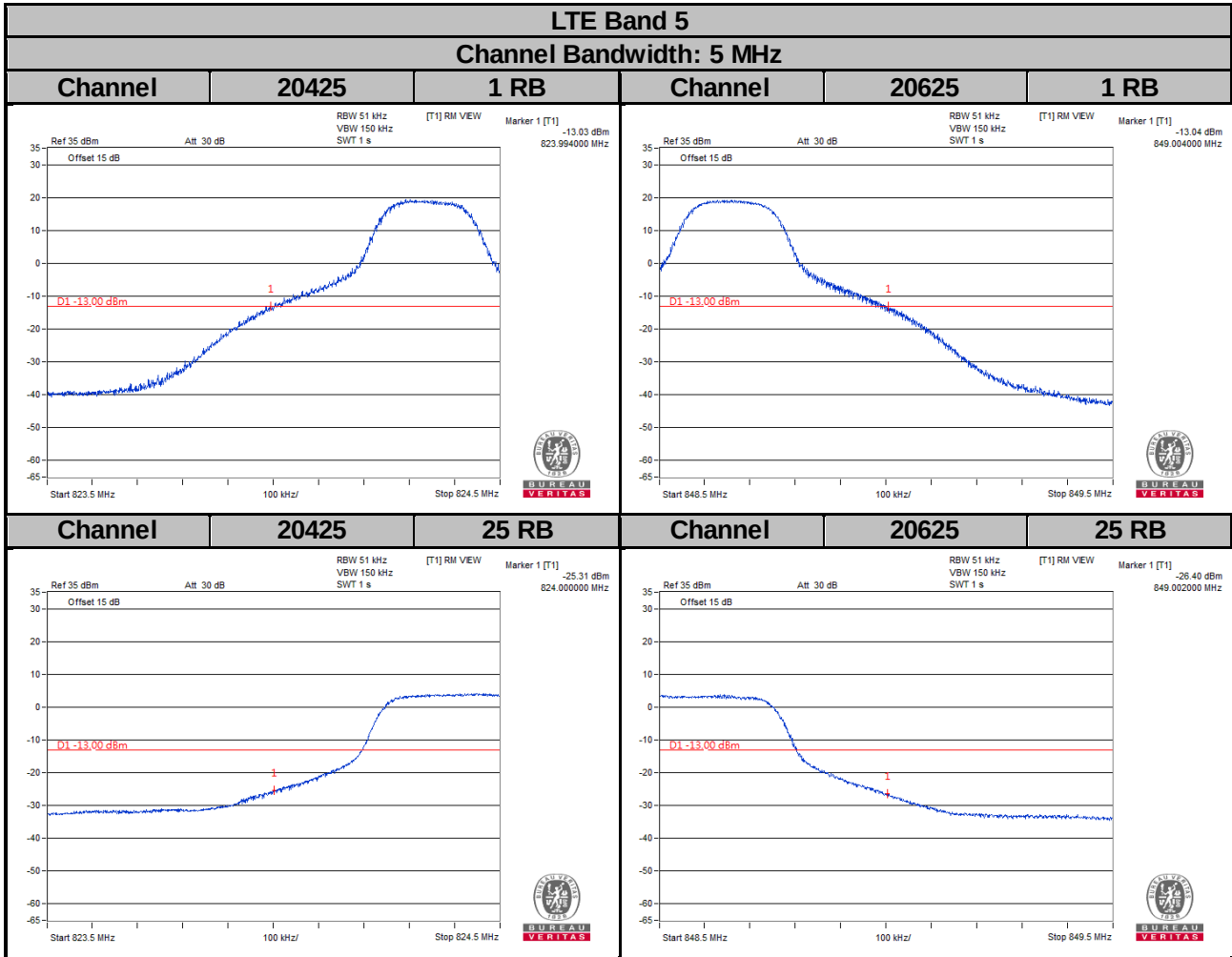
Channel Bandwidth: 1.4 MHz

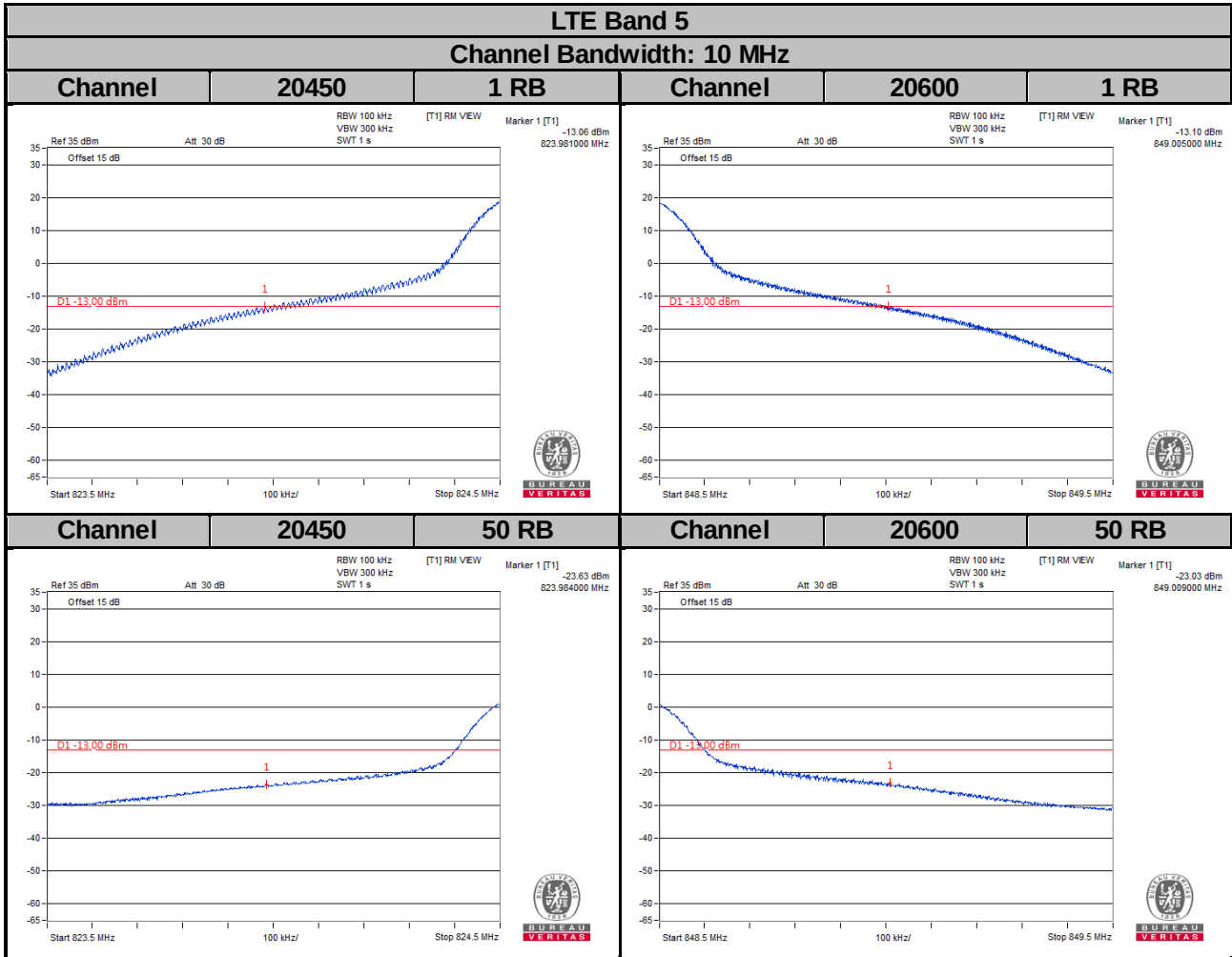


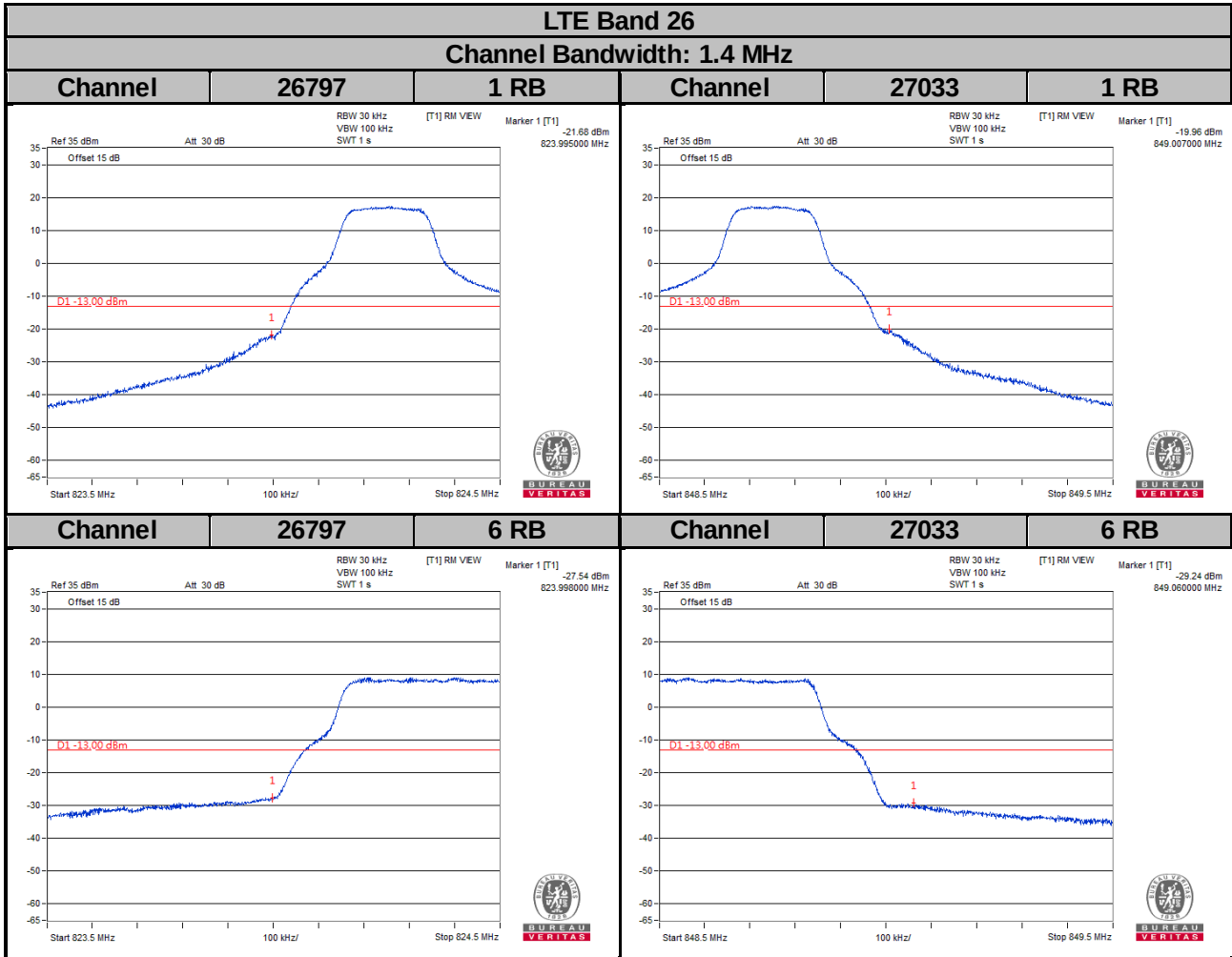
## LTE Band 5

Channel Bandwidth: 3 MHz



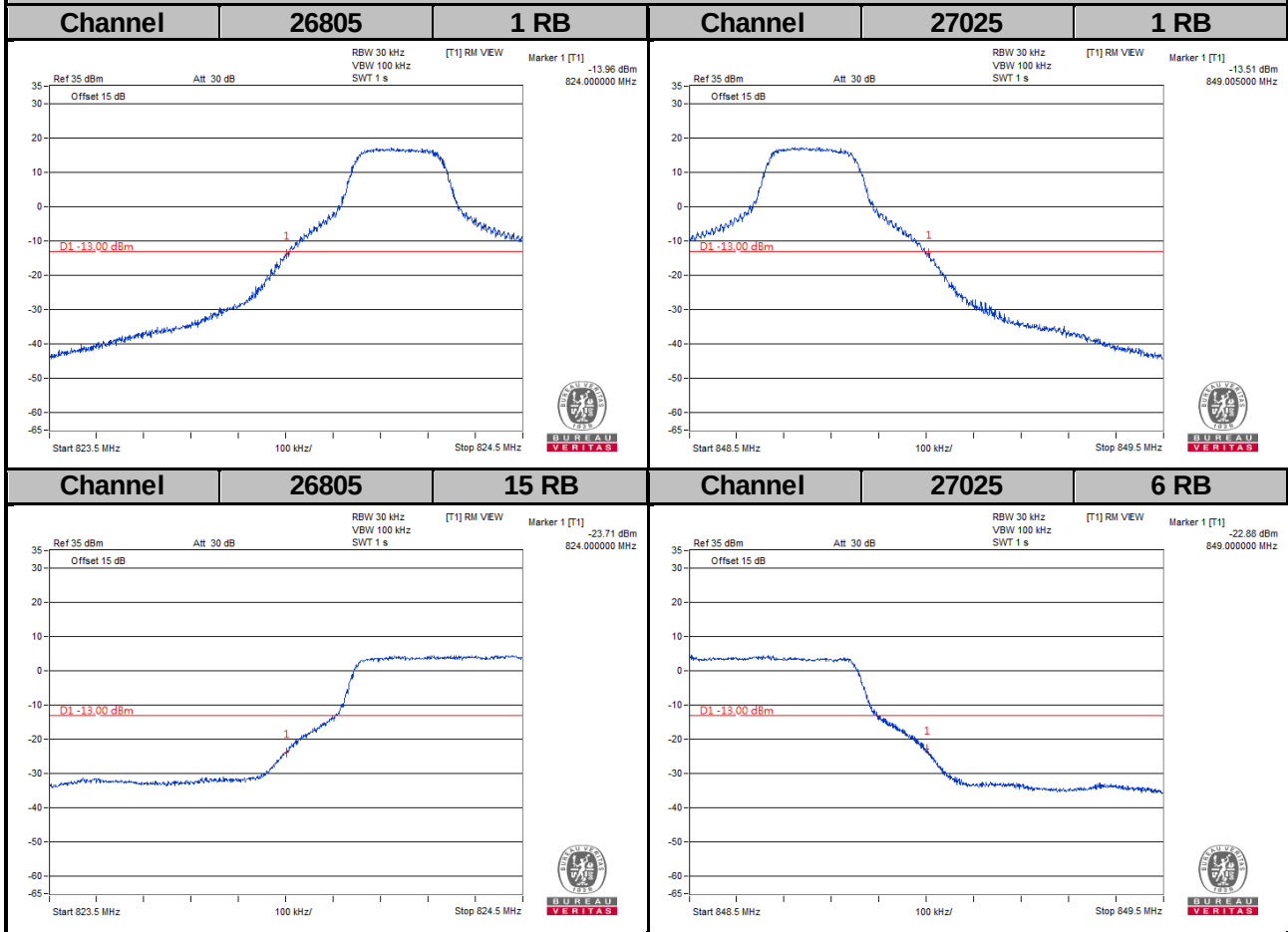


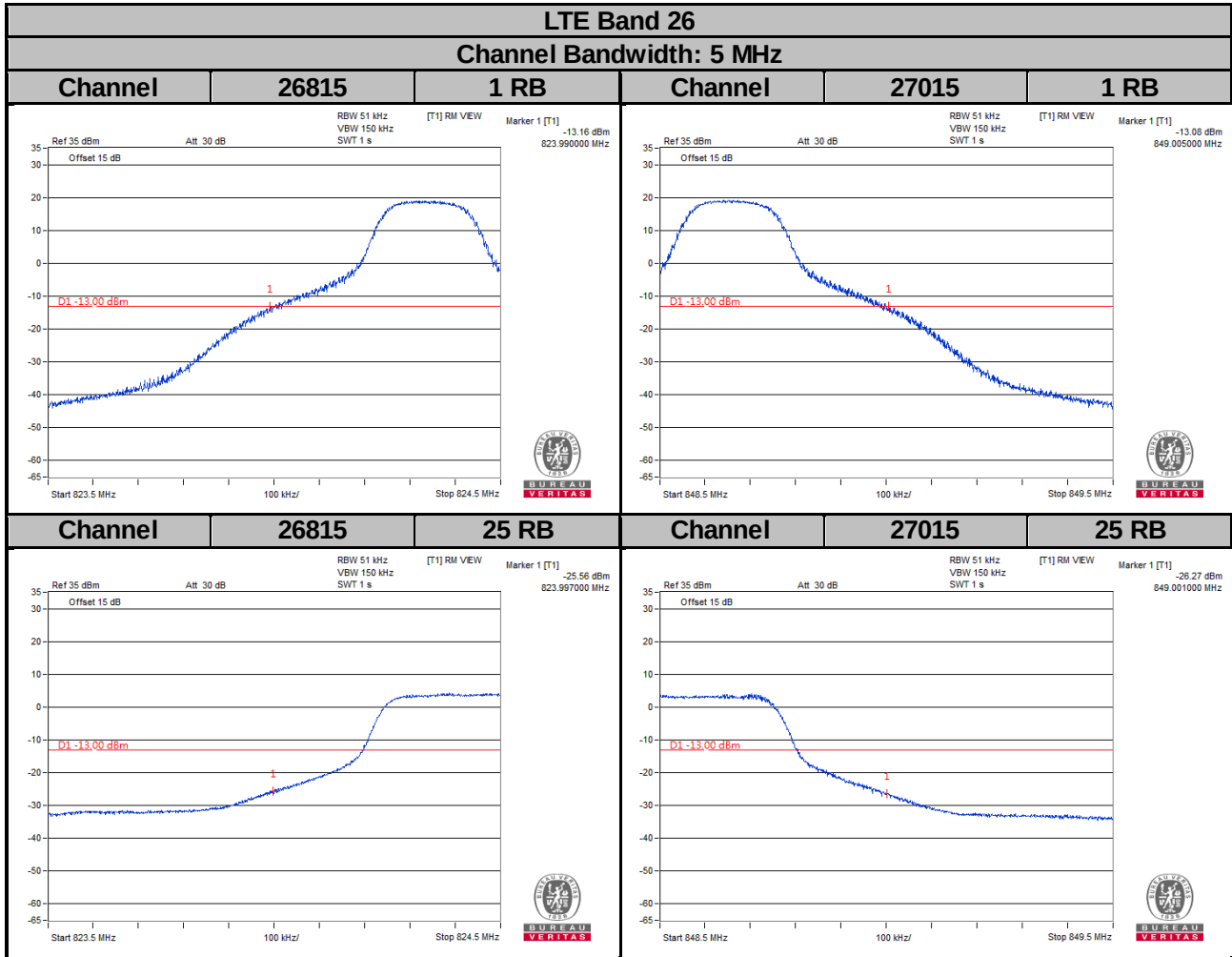


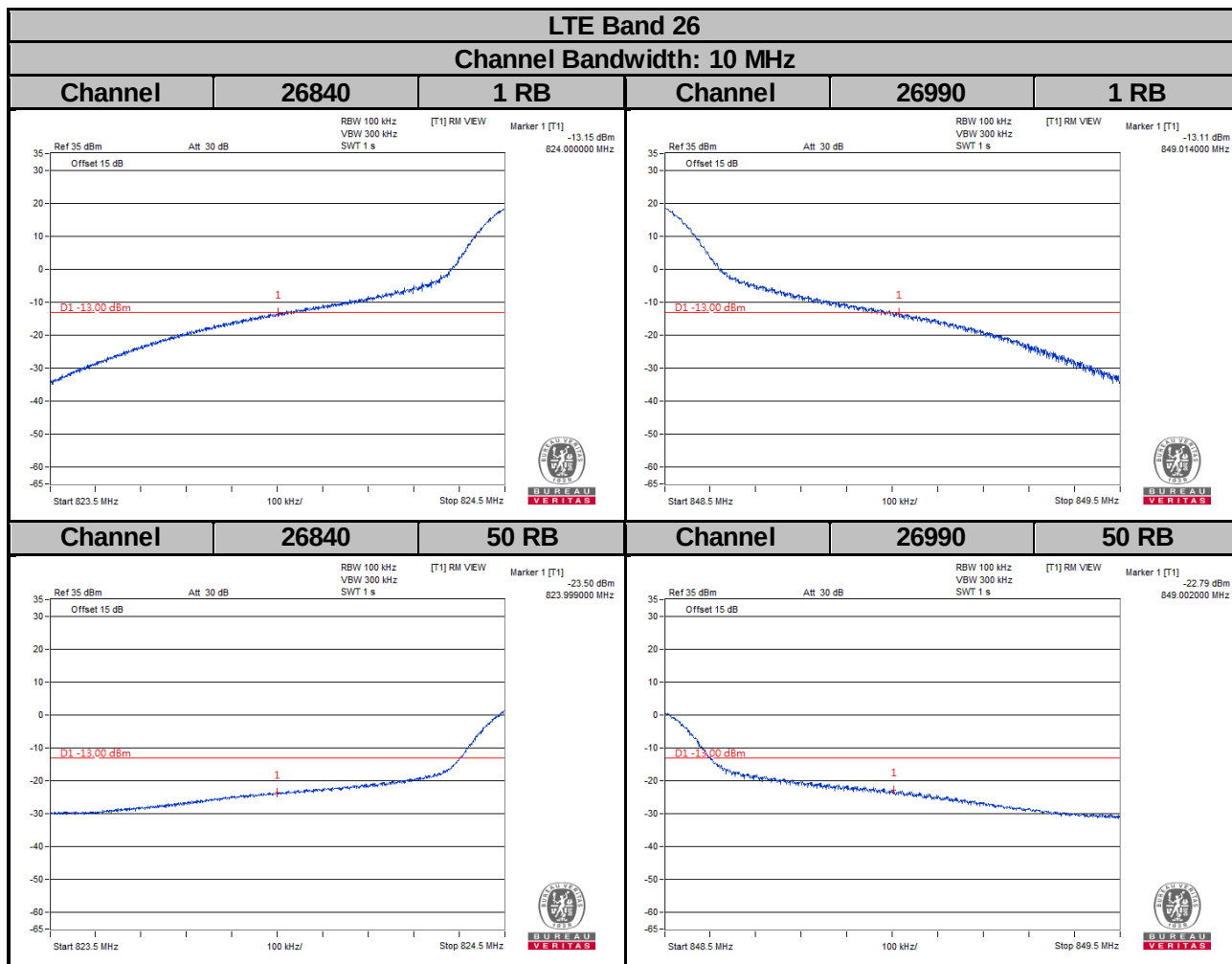


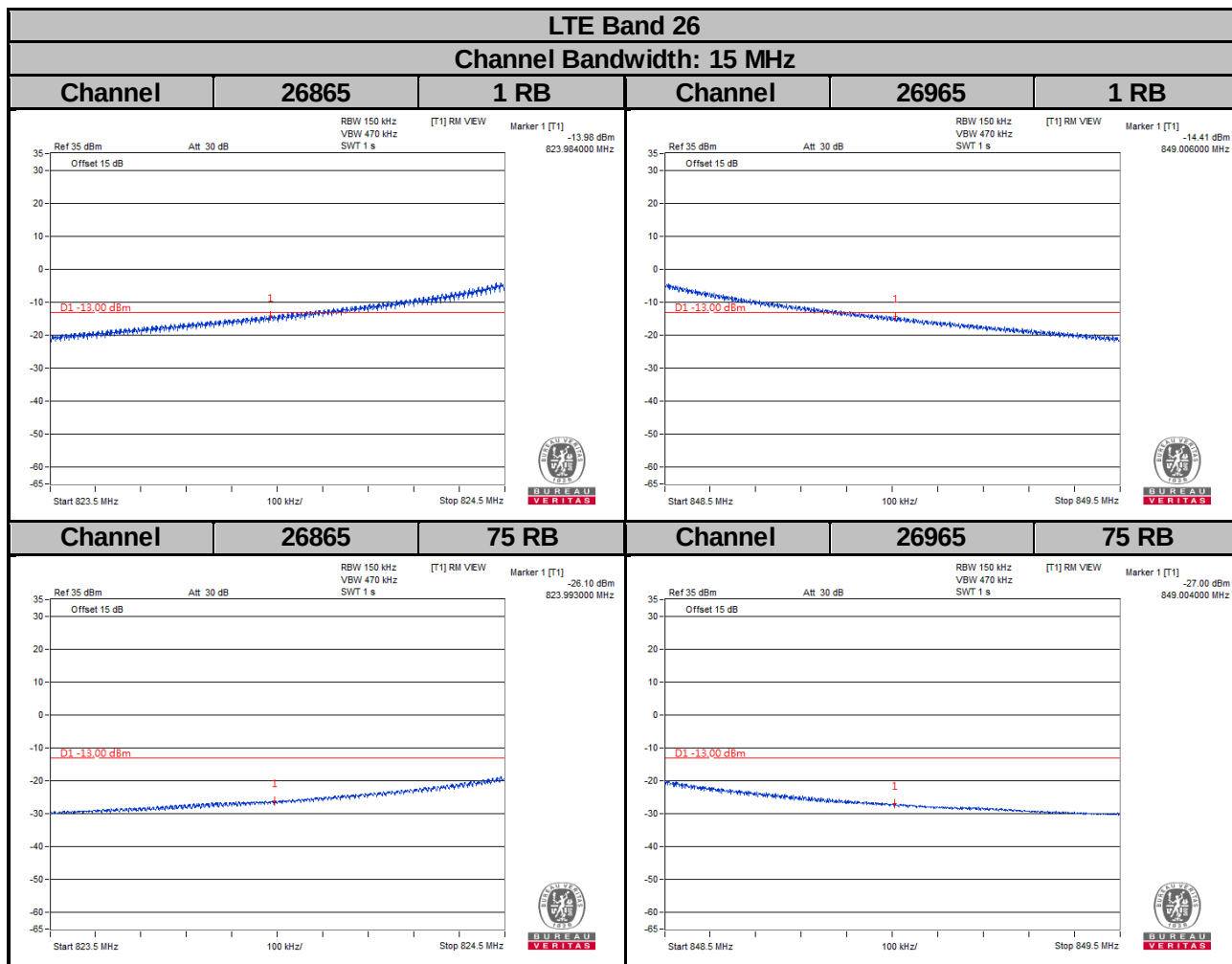
# LTE Band 26

Channel Bandwidth: 3 MHz







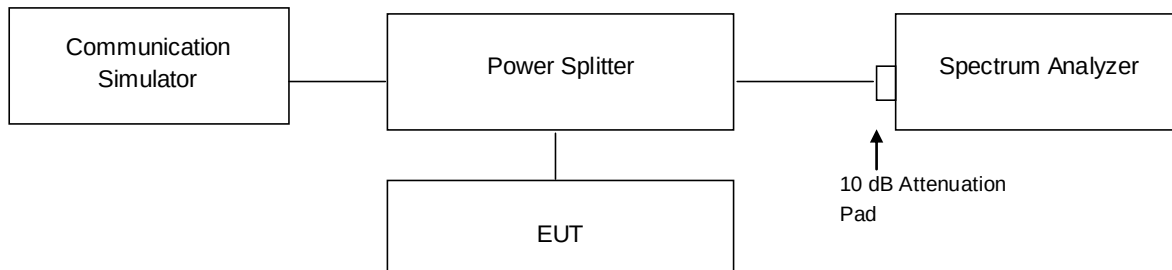


## 4.5 Peak to Average Ratio

### 4.5.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 4.5.2 Test Setup

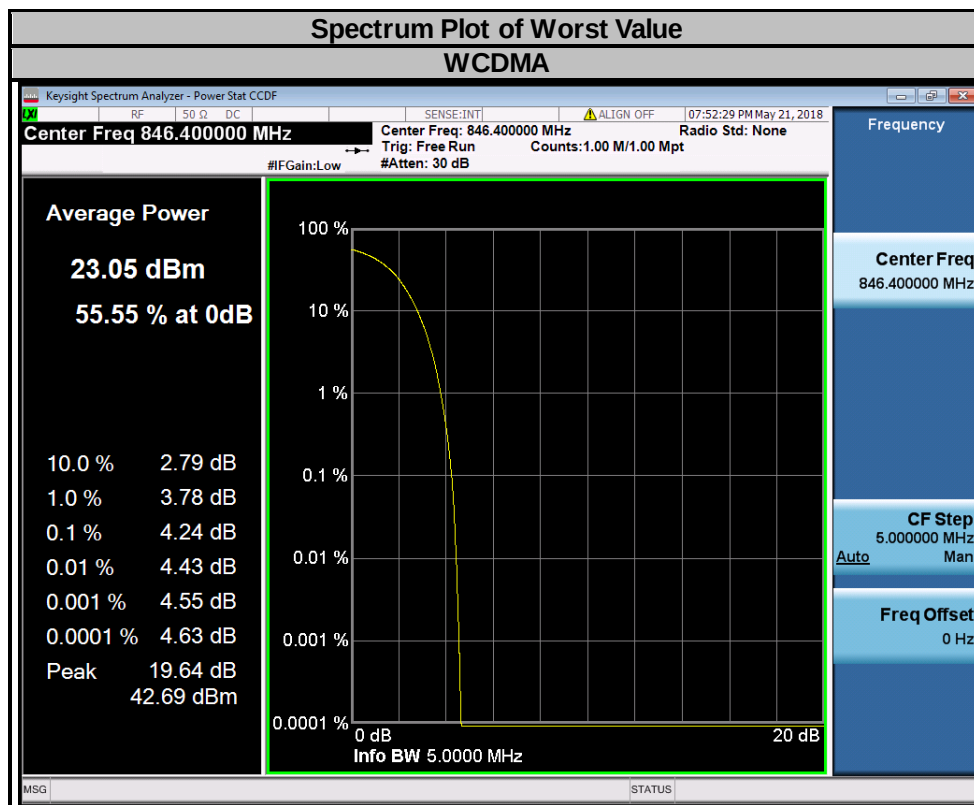


### 4.5.3 Test Procedures

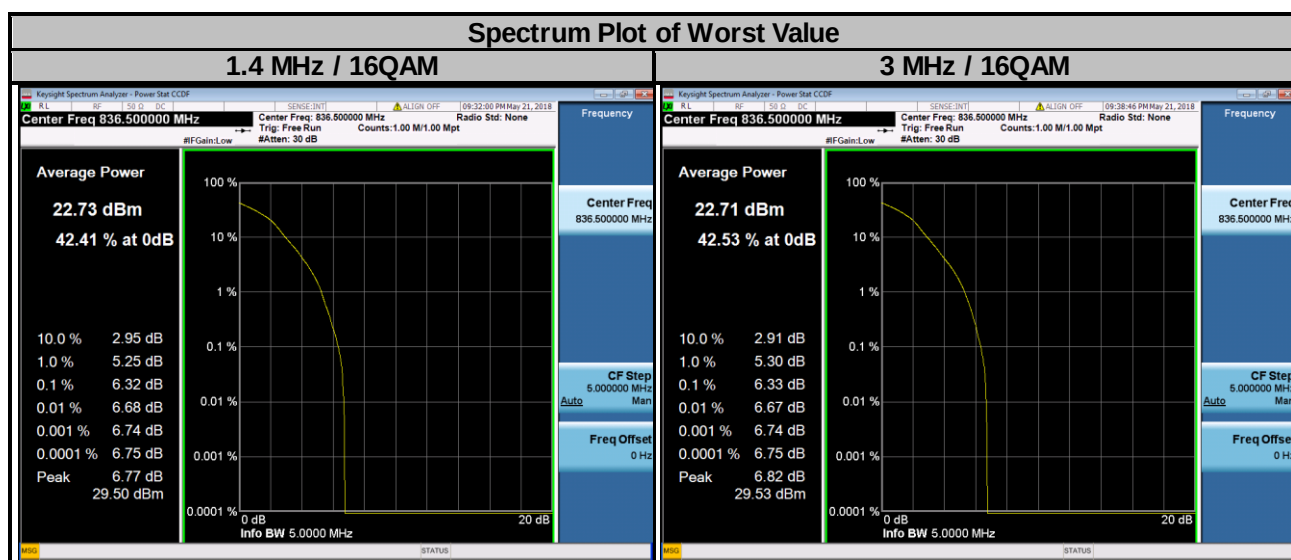
1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

#### 4.5.4 Test Results

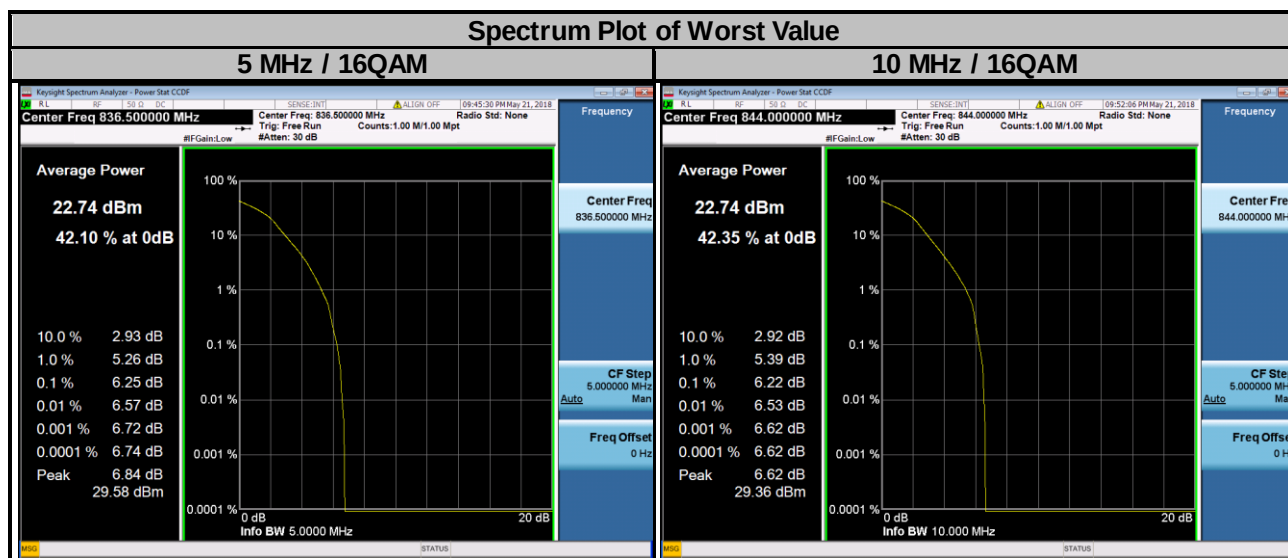
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) |
|---------|-----------------|----------------------------|
|         |                 | WCDMA                      |
| 4132    | 826.4           | 3.22                       |
| 4182    | 836.4           | 3.32                       |
| 4233    | 846.6           | 4.24                       |



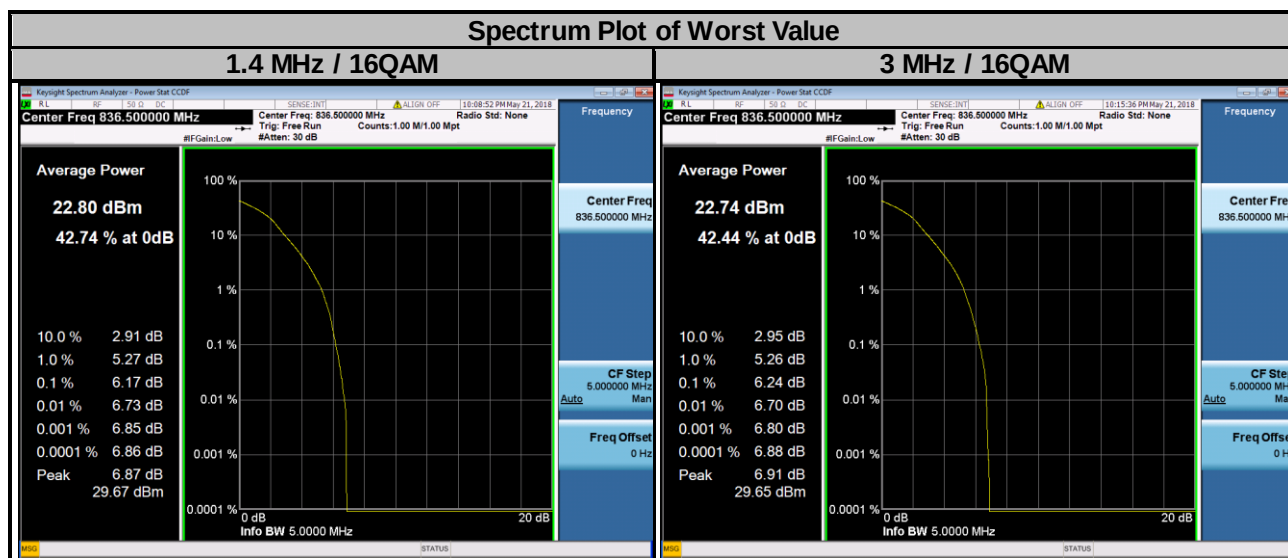
| LTE Band 5                 |                 |                            |       |                          |                 |                            |       |
|----------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 1.4 MHz |                 |                            |       | Channel Bandwidth: 3 MHz |                 |                            |       |
| Channel                    | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                            |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 20407                      | 824.7           | 5.08                       | 5.46  | 20415                    | 825.5           | 5.14                       | 5.50  |
| 20525                      | 836.5           | 5.37                       | 6.32  | 20525                    | 836.5           | 5.48                       | 6.33  |
| 20643                      | 848.3           | 4.81                       | 5.30  | 20635                    | 847.5           | 4.45                       | 4.86  |



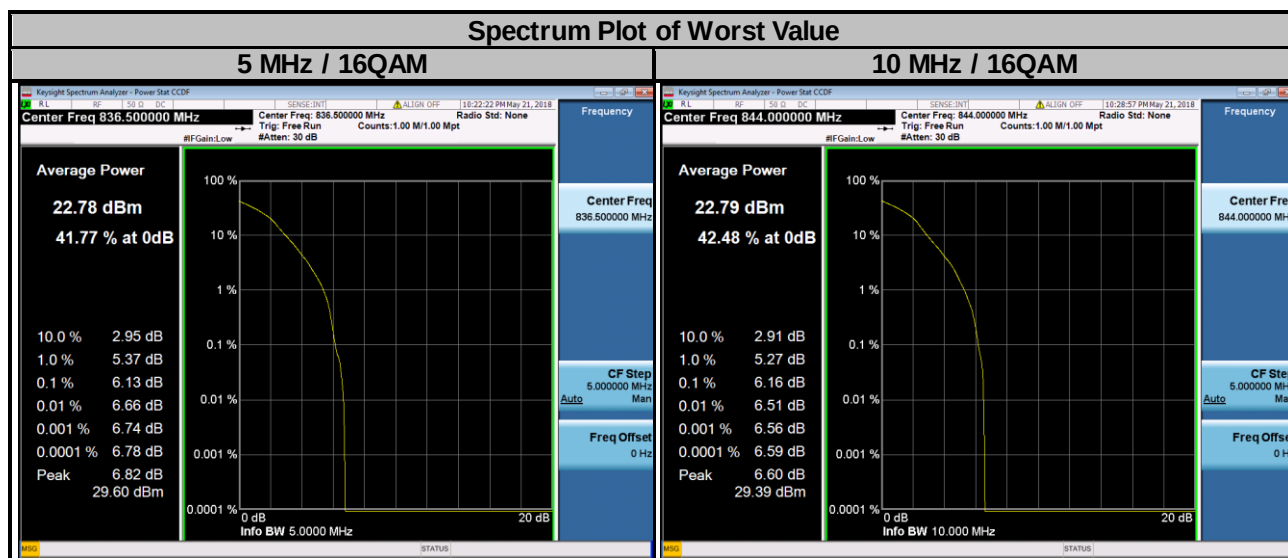
| LTE Band 5               |                 |                            |       |                           |                 |                            |       |
|--------------------------|-----------------|----------------------------|-------|---------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 5 MHz |                 |                            |       | Channel Bandwidth: 10 MHz |                 |                            |       |
| Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                   | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                          |                 | QPSK                       | 16QAM |                           |                 | QPSK                       | 16QAM |
| 20425                    | 826.5           | 5.14                       | 5.51  | 20450                     | 829.0           | 5.16                       | 5.50  |
| 20525                    | 836.5           | 5.36                       | 6.25  | 20525                     | 836.5           | 5.10                       | 5.77  |
| 20625                    | 846.5           | 4.45                       | 4.78  | 20600                     | 844.0           | 5.49                       | 6.22  |



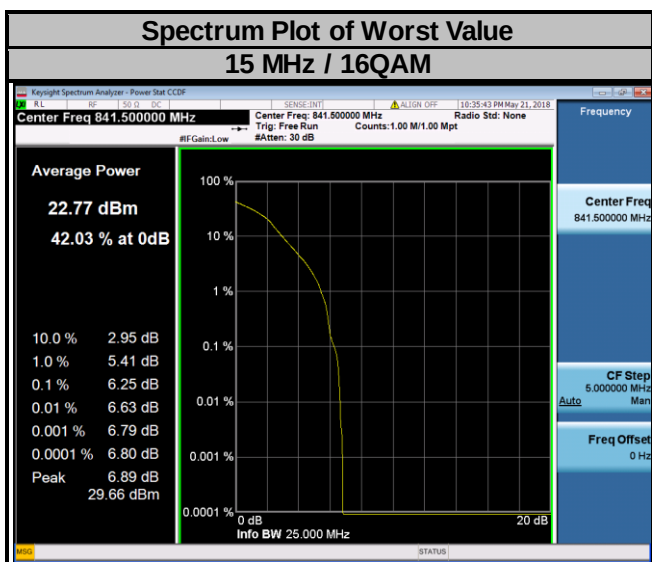
| LTE Band 26                |                 |                            |       |                          |                 |                            |       |
|----------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 1.4 MHz |                 |                            |       | Channel Bandwidth: 3 MHz |                 |                            |       |
| Channel                    | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                            |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 26797                      | 824.7           | 5.11                       | 5.42  | 26805                    | 825.5           | 5.14                       | 5.48  |
| 26915                      | 836.5           | 5.37                       | 6.17  | 26915                    | 836.5           | 5.46                       | 6.24  |
| 27033                      | 848.3           | 4.87                       | 5.33  | 27025                    | 847.5           | 4.40                       | 4.83  |



| LTE Band 26              |                 |                            |       |                           |                 |                            |       |
|--------------------------|-----------------|----------------------------|-------|---------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 5 MHz |                 |                            |       | Channel Bandwidth: 10 MHz |                 |                            |       |
| Channel                  | Frequency (MHz) | Peak to Average Ratio (dB) |       | Channel                   | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                          |                 | QPSK                       | 16QAM |                           |                 | QPSK                       | 16QAM |
| 26815                    | 826.5           | 5.14                       | 5.46  | 26840                     | 829.0           | 5.11                       | 5.42  |
| 26915                    | 836.5           | 5.29                       | 6.13  | 26915                     | 836.5           | 5.09                       | 5.60  |
| 27015                    | 846.5           | 4.38                       | 4.79  | 26990                     | 844.0           | 5.40                       | 6.16  |



| LTE Band 26               |                 |                            |       |
|---------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 15 MHz |                 |                            |       |
| Channel                   | Frequency (MHz) | Peak to Average Ratio (dB) |       |
|                           |                 | QPSK                       | 16QAM |
| 26865                     | 831.5           | 5.04                       | 5.34  |
| 26915                     | 836.5           | 4.92                       | 5.22  |
| 26965                     | 841.5           | 5.36                       | 6.25  |

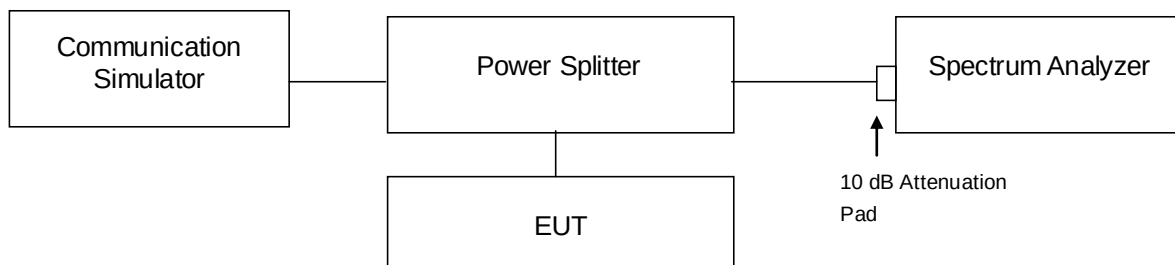


## 4.6 Conducted Spurious Emissions

### 4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to -13 dBm.

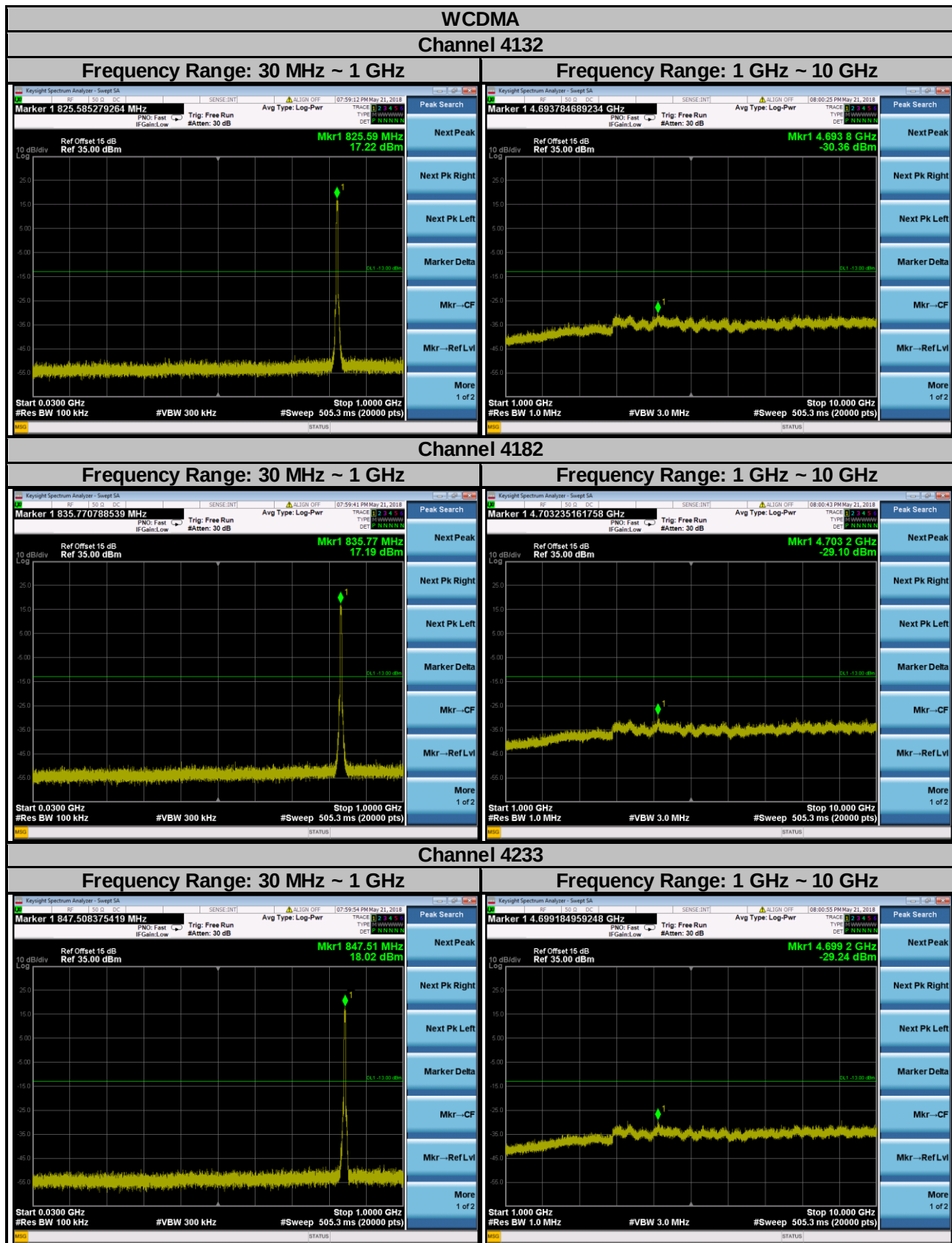
### 4.6.2 Test Setup



### 4.6.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 30 MHz to 10 GHz. 20 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.

#### 4.6.4 Test Results

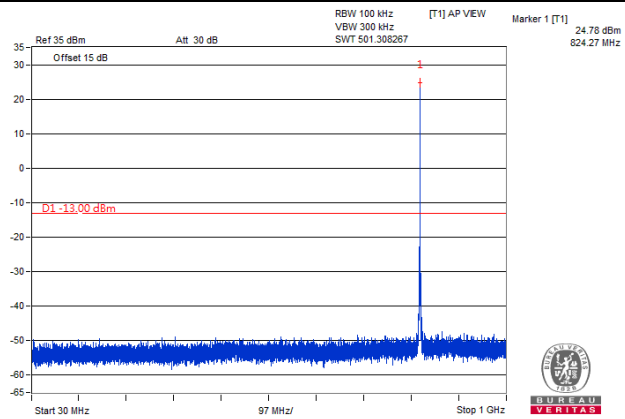


## LTE Band 5

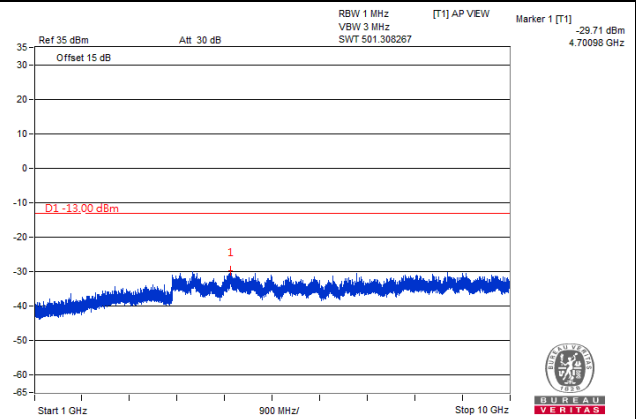
Channel Bandwidth: 1.4 MHz

Channel 20407

Frequency Range: 30 MHz ~ 1 GHz

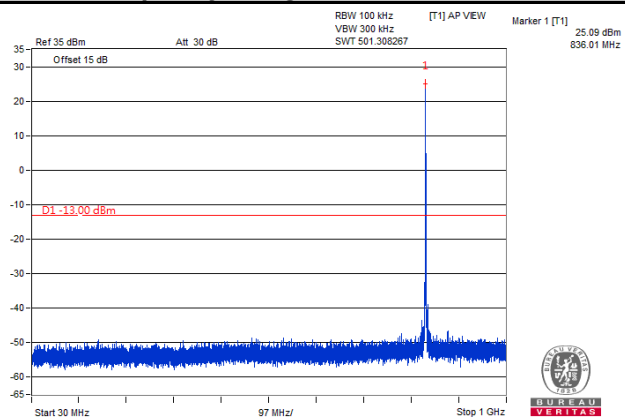


Frequency Range: 1 GHz ~ 10 GHz

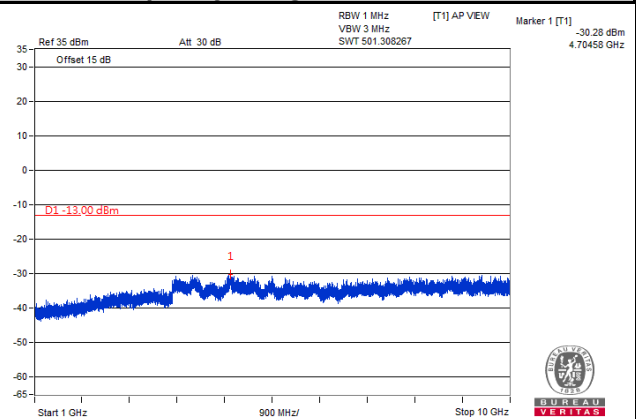


## Channel 20525

Frequency Range: 30 MHz ~ 1 GHz

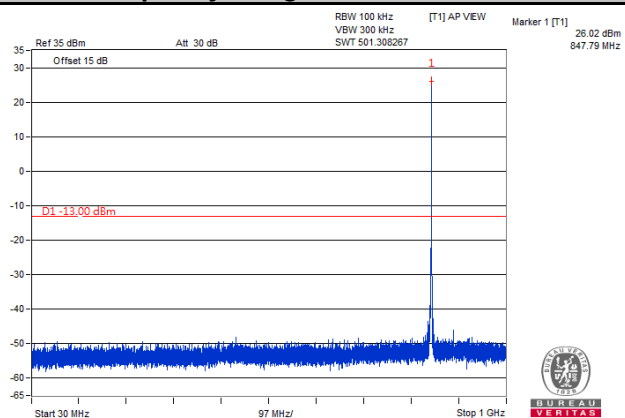


Frequency Range: 1 GHz ~ 10 GHz

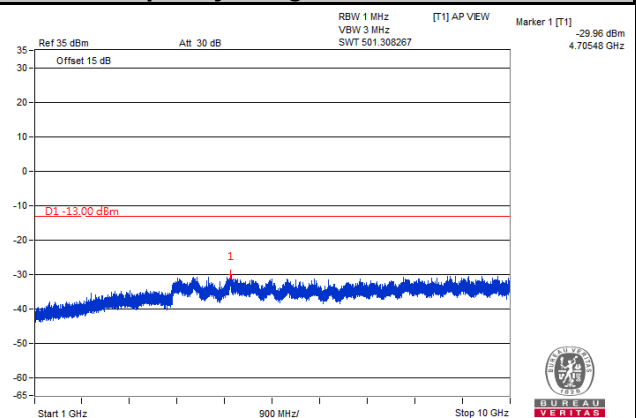


## Channel 20643

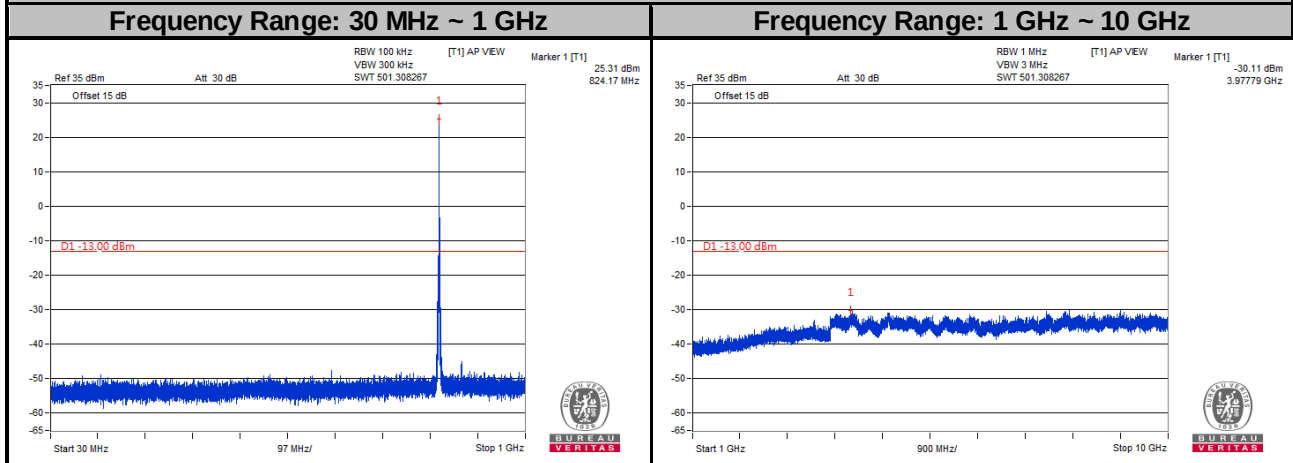
Frequency Range: 30 MHz ~ 1 GHz



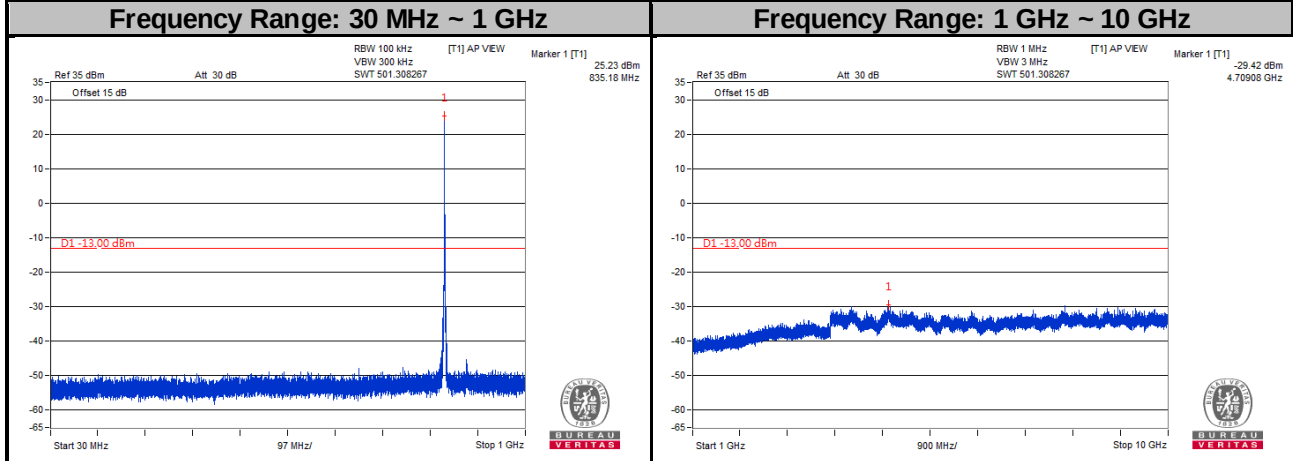
Frequency Range: 1 GHz ~ 10 GHz



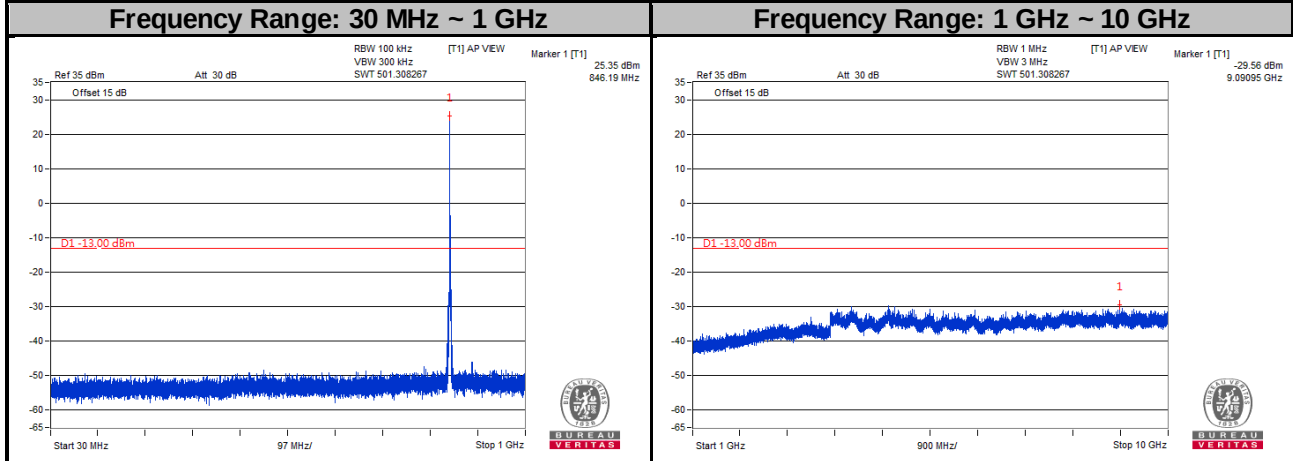
**LTE Band 5**  
**Channel Bandwidth: 3 MHz**  
**Channel 20415**



**Channel 20525**



**Channel 20635**

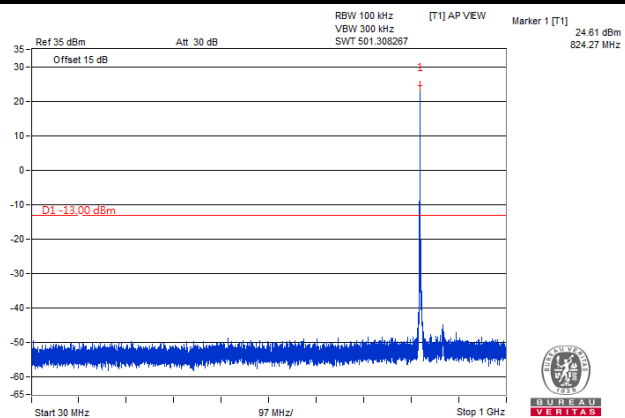


## LTE Band 5

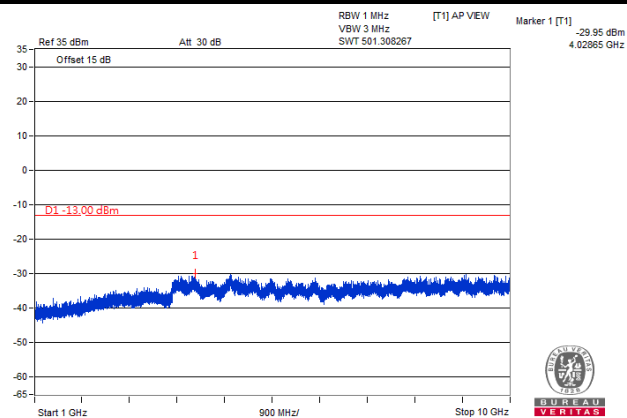
Channel Bandwidth: 5 MHz

Channel 20425

Frequency Range: 30 MHz ~ 1 GHz

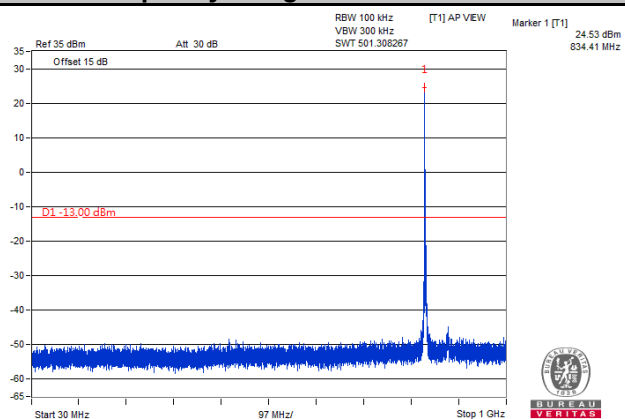


Frequency Range: 1 GHz ~ 10 GHz

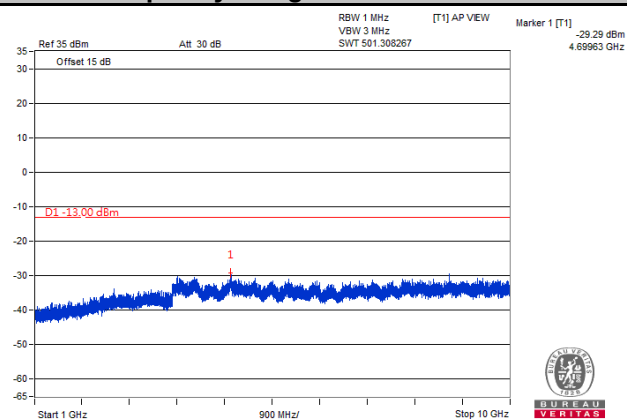


## Channel 20525

Frequency Range: 30 MHz ~ 1 GHz

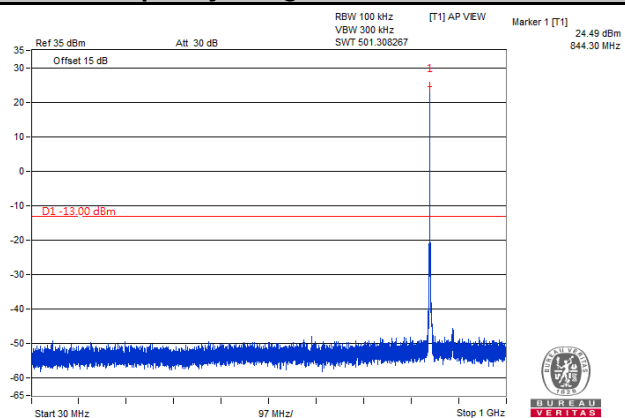


Frequency Range: 1 GHz ~ 10 GHz

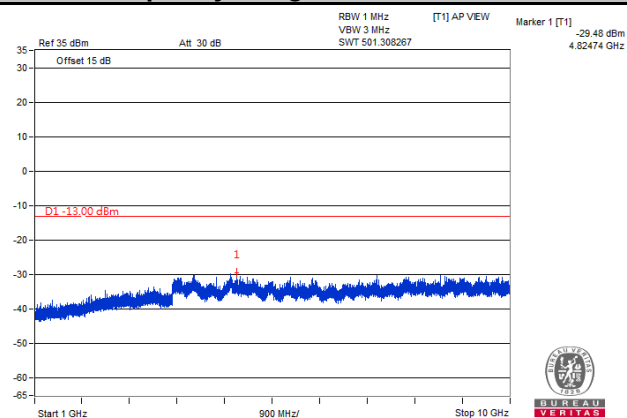


## Channel 20625

Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz

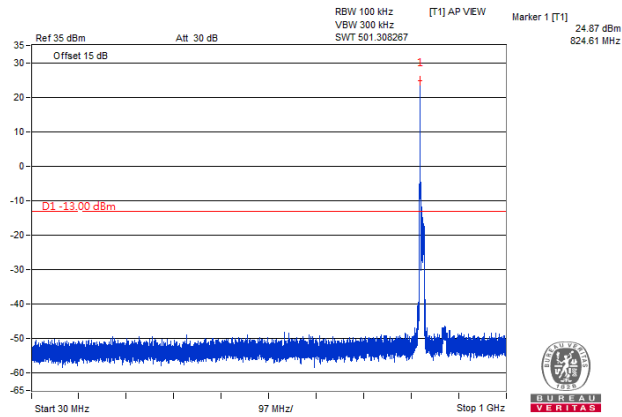


## LTE Band 5

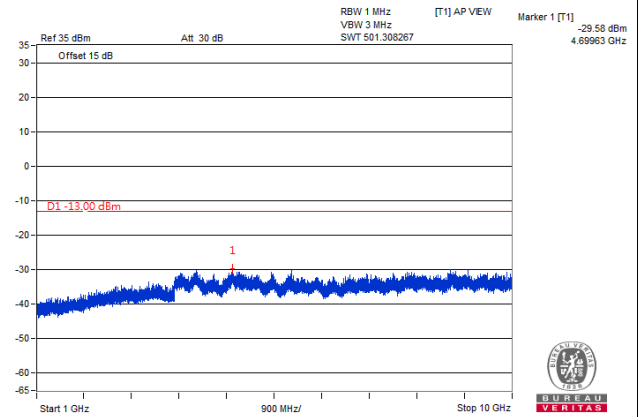
Channel Bandwidth: 10 MHz

Channel 20450

Frequency Range: 30 MHz ~ 1 GHz

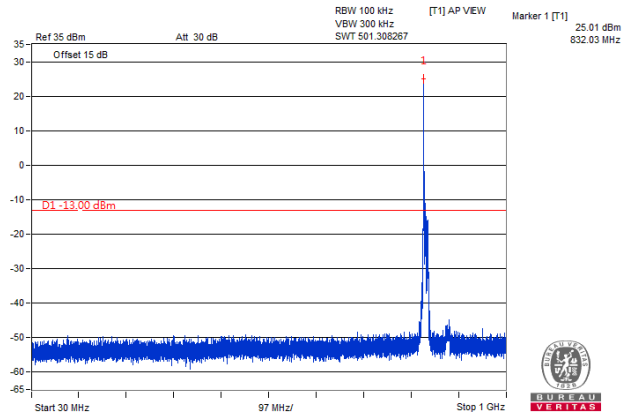


Frequency Range: 1 GHz ~ 10 GHz

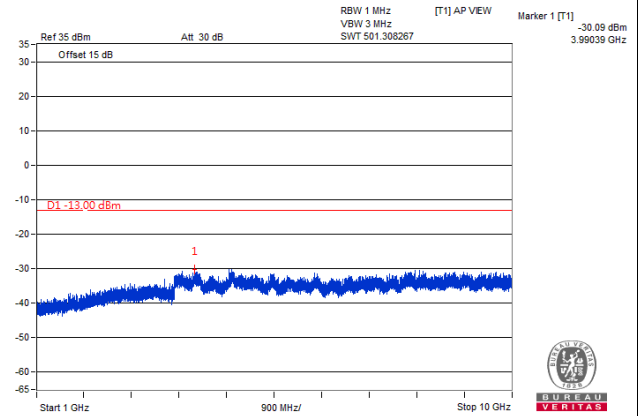


## Channel 20525

Frequency Range: 30 MHz ~ 1 GHz

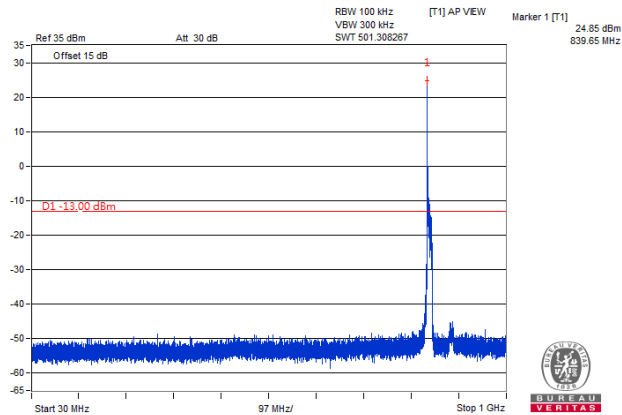


Frequency Range: 1 GHz ~ 10 GHz

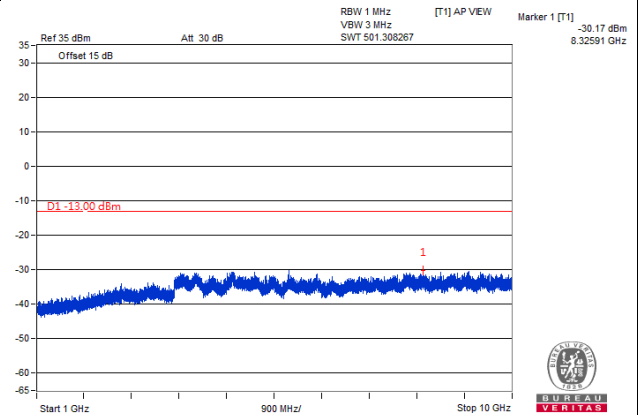


## Channel 20600

Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz

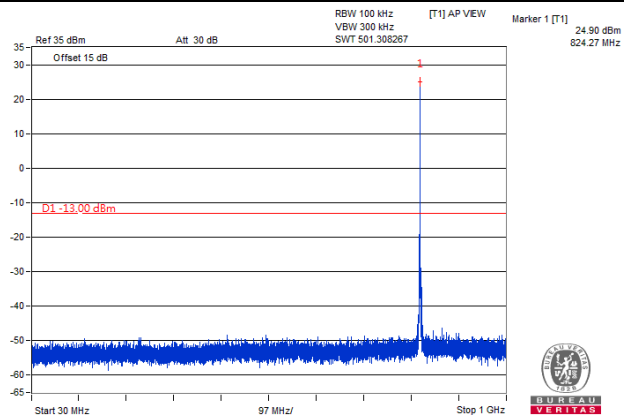


## LTE Band 26

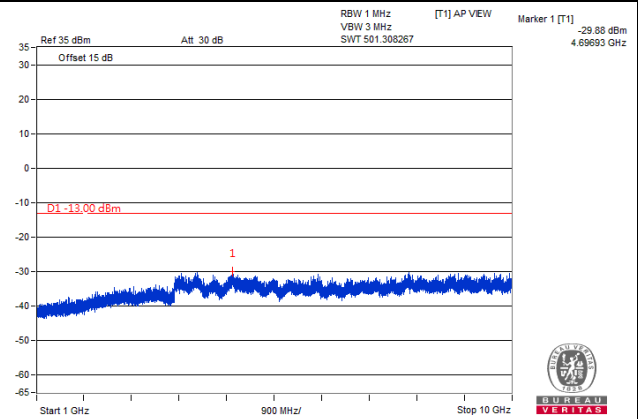
Channel Bandwidth: 1.4 MHz

Channel 26797

Frequency Range: 30 MHz ~ 1 GHz

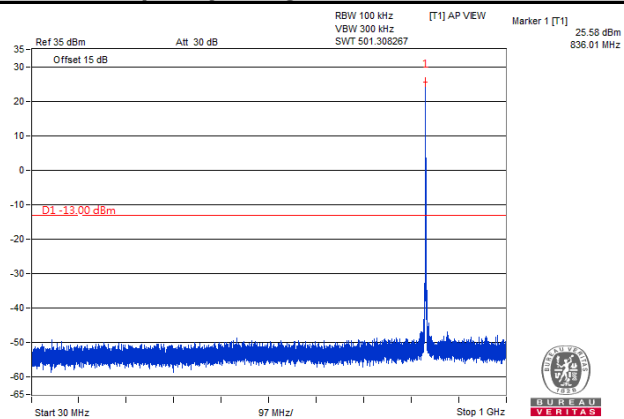


Frequency Range: 1 GHz ~ 10 GHz

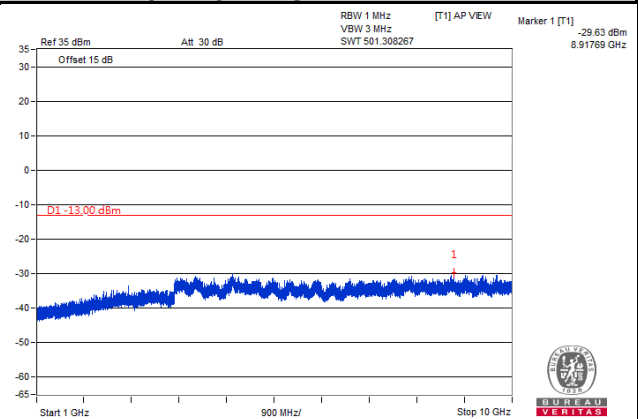


## Channel 26915

Frequency Range: 30 MHz ~ 1 GHz

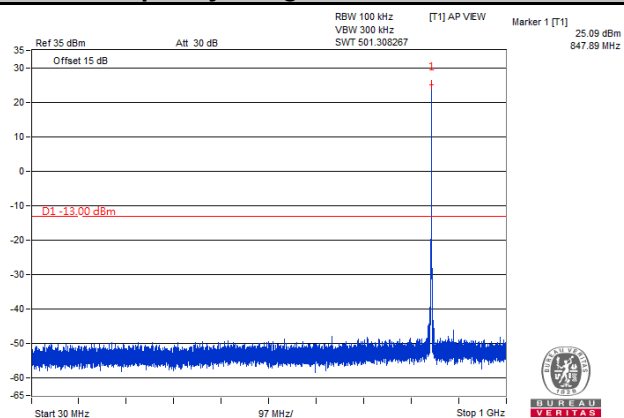


Frequency Range: 1 GHz ~ 10 GHz

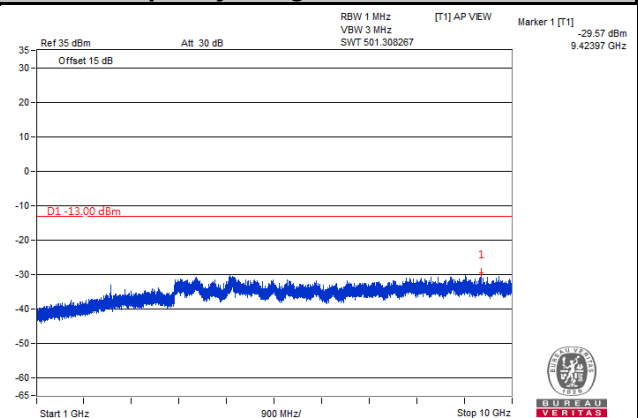


## Channel 27033

Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz

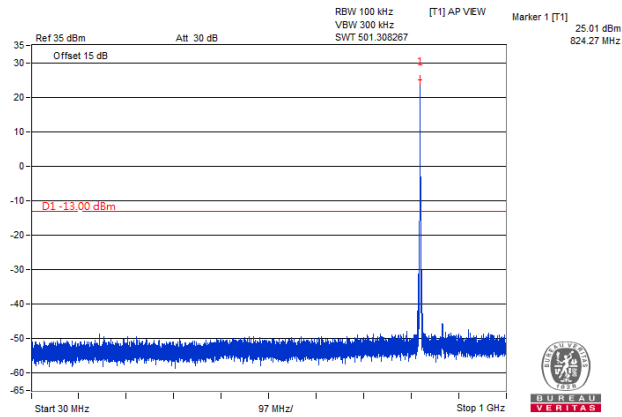


## LTE Band 26

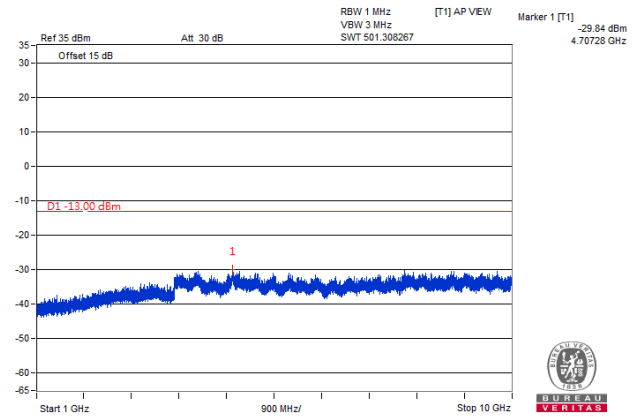
Channel Bandwidth: 3 MHz

Channel 26805

Frequency Range: 30 MHz ~ 1 GHz

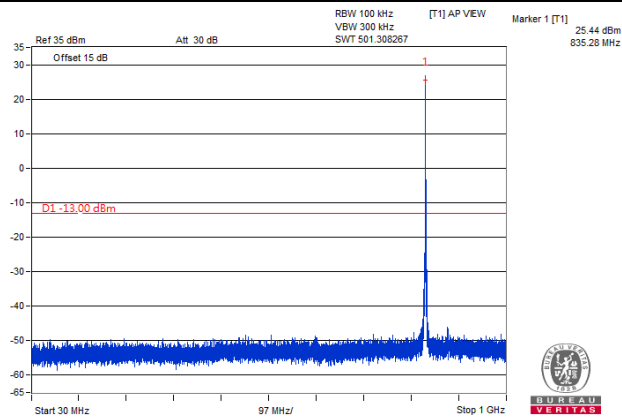


Frequency Range: 1 GHz ~ 10 GHz

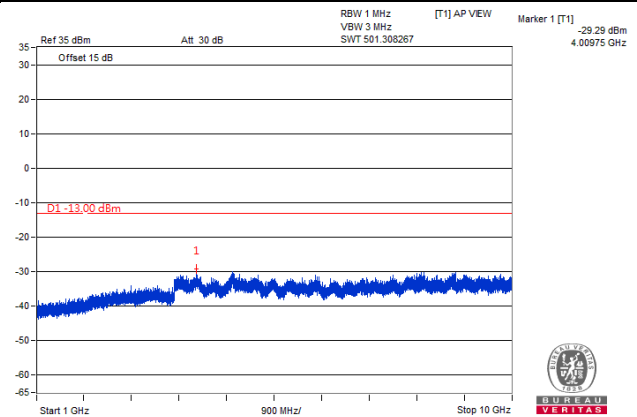


## Channel 26915

Frequency Range: 30 MHz ~ 1 GHz

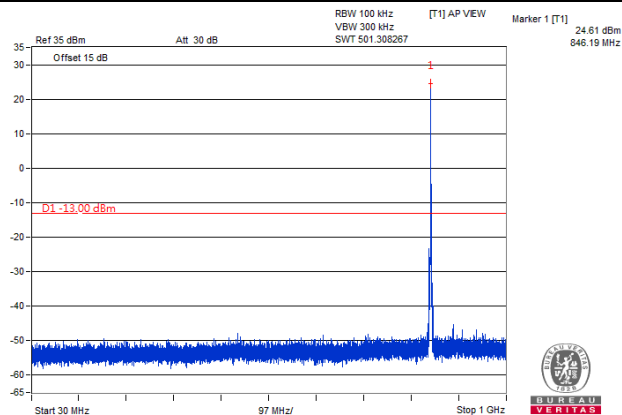


Frequency Range: 1 GHz ~ 10 GHz

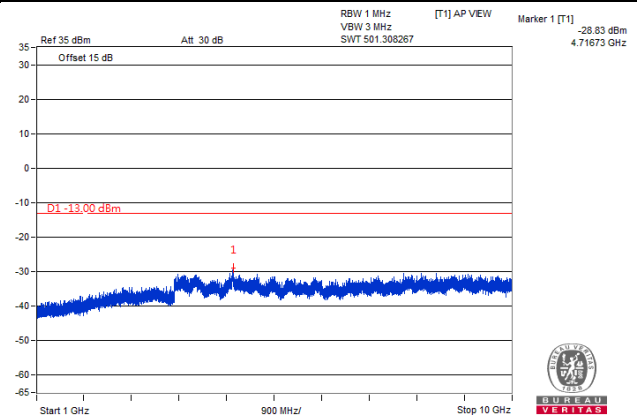


## Channel 27025

Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz

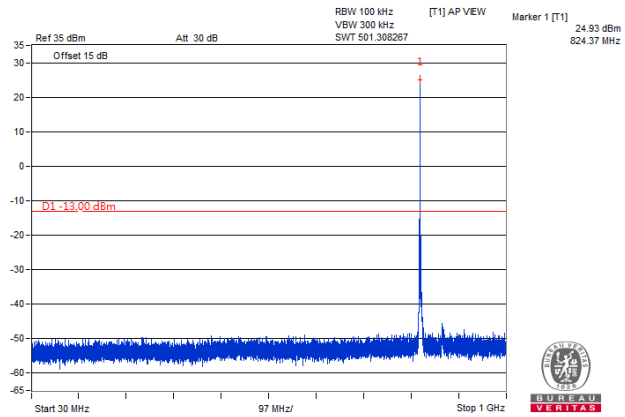


## LTE Band 26

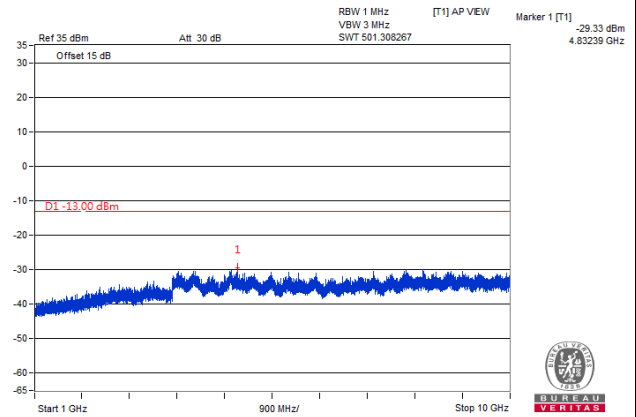
Channel Bandwidth: 5 MHz

Channel 26815

Frequency Range: 30 MHz ~ 1 GHz

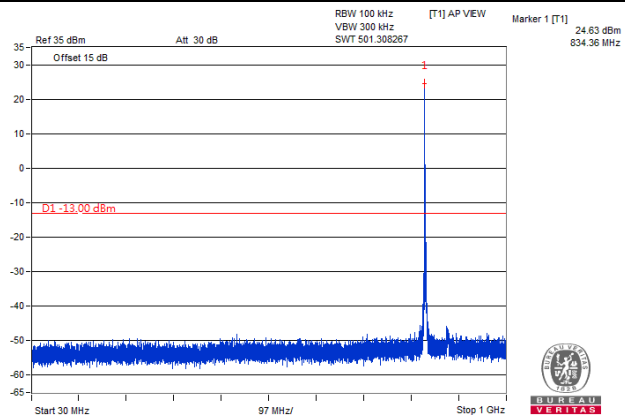


Frequency Range: 1 GHz ~ 10 GHz

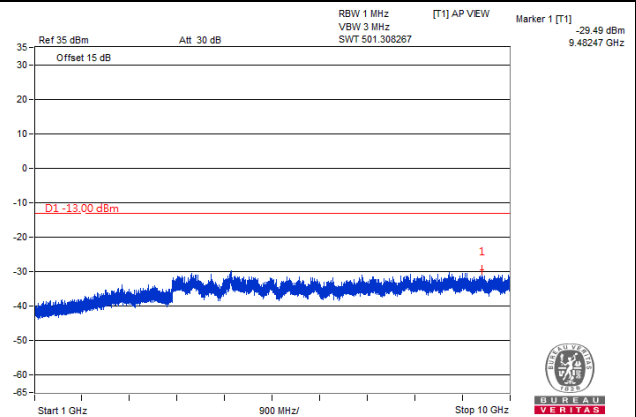


## Channel 26915

Frequency Range: 30 MHz ~ 1 GHz

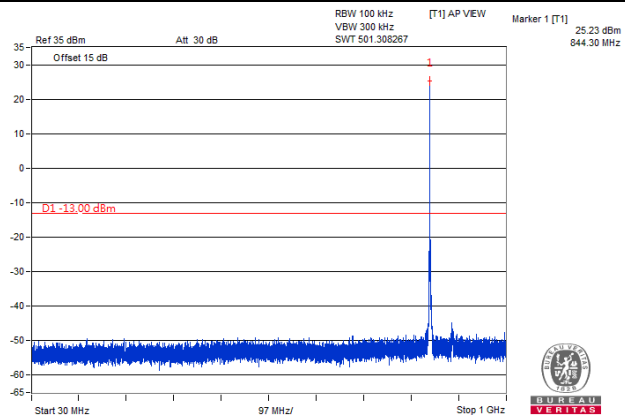


Frequency Range: 1 GHz ~ 10 GHz

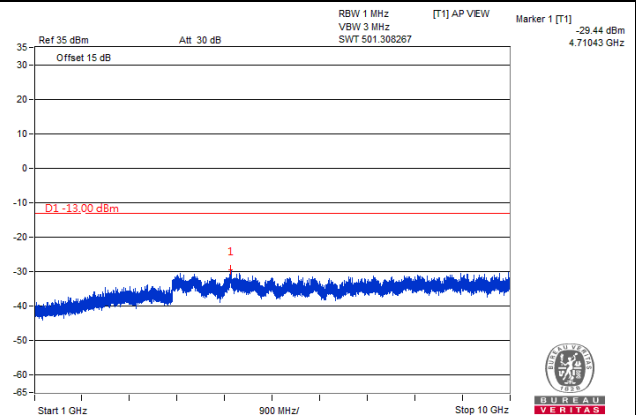


## Channel 27015

Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



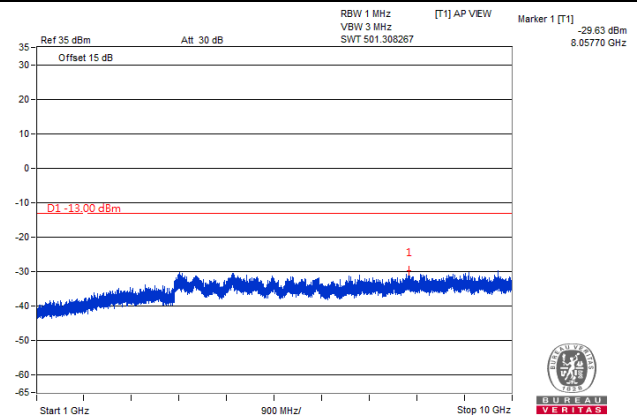
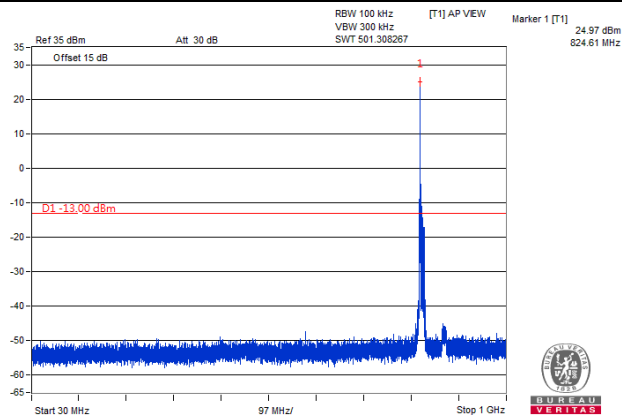
## LTE Band 26

Channel Bandwidth: 10 MHz

Channel 26840

Frequency Range: 30 MHz ~ 1 GHz

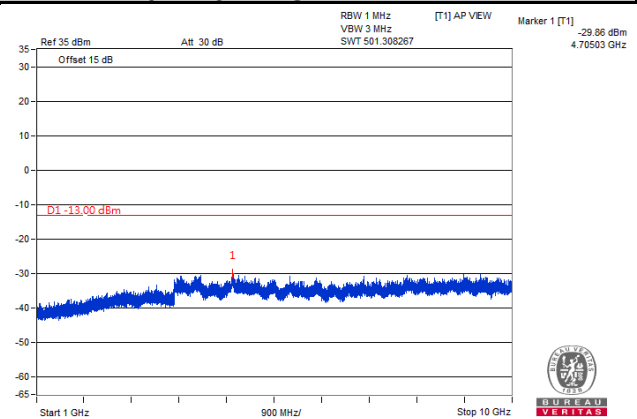
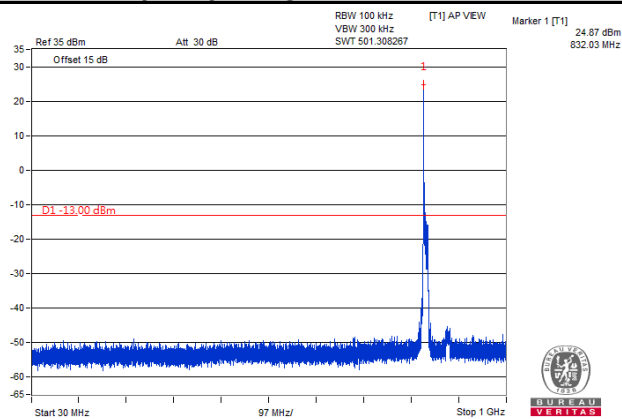
Frequency Range: 1 GHz ~ 10 GHz



## Channel 26915

Frequency Range: 30 MHz ~ 1 GHz

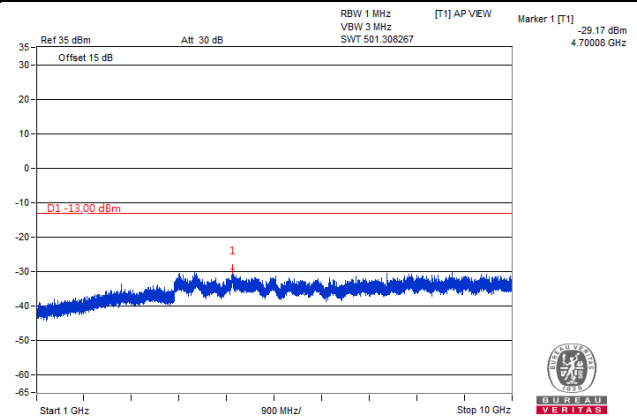
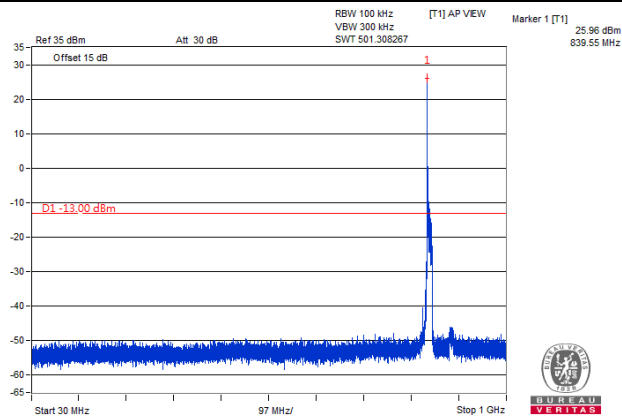
Frequency Range: 1 GHz ~ 10 GHz



## Channel 26990

Frequency Range: 30 MHz ~ 1 GHz

Frequency Range: 1 GHz ~ 10 GHz

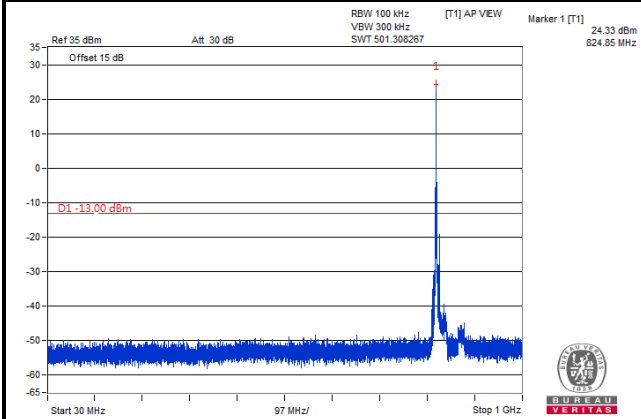


## LTE Band 26

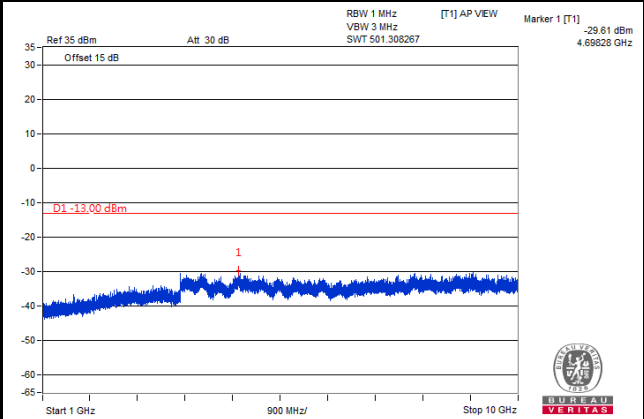
Channel Bandwidth: 15 MHz

Channel 26865

Frequency Range: 30 MHz ~ 1 GHz

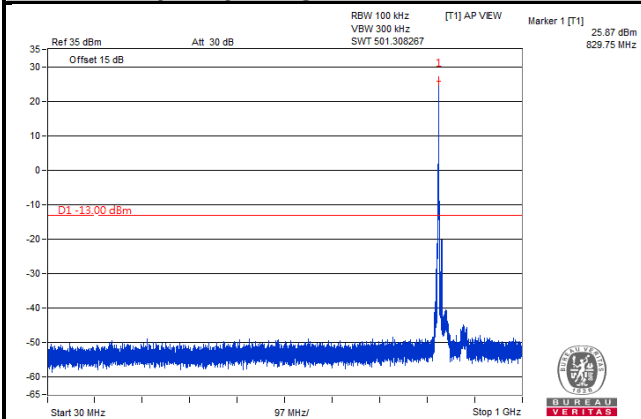


Frequency Range: 1 GHz ~ 10 GHz

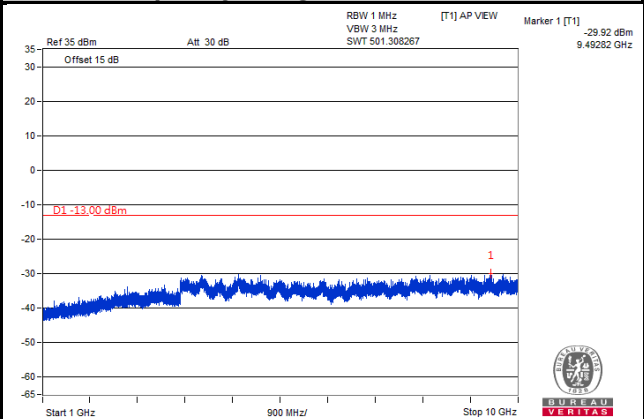


## Channel 26915

Frequency Range: 30 MHz ~ 1 GHz

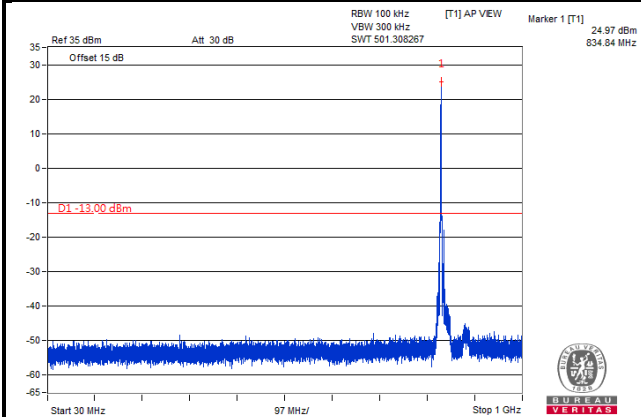


Frequency Range: 1 GHz ~ 10 GHz

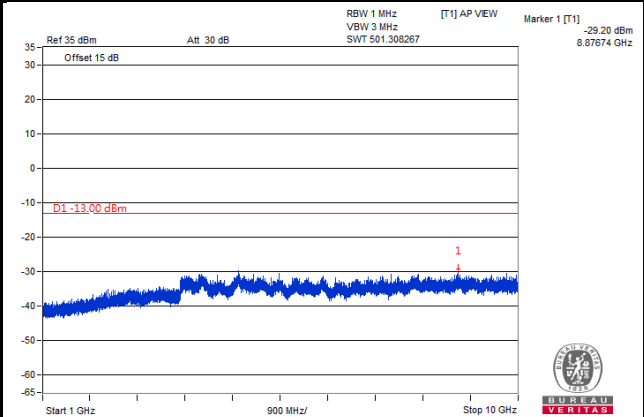


## Channel 26965

Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



## 4.7 Radiated Emission Measurement

### 4.7.1 Limits of Radiated Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit is equal to -13 dBm.

### 4.7.2 Test Procedure

- Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
- E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15 \text{ dBi}.$

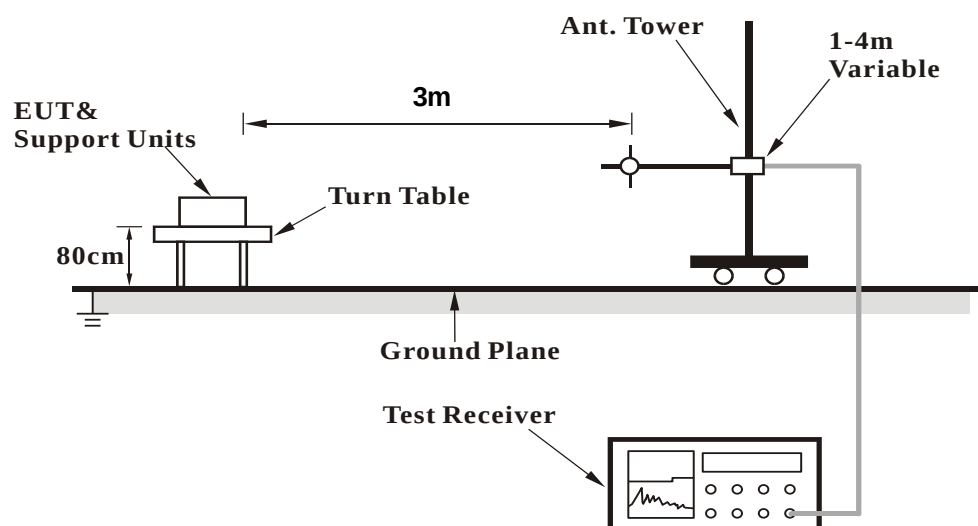
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

### 4.7.3 Deviation from Test Standard

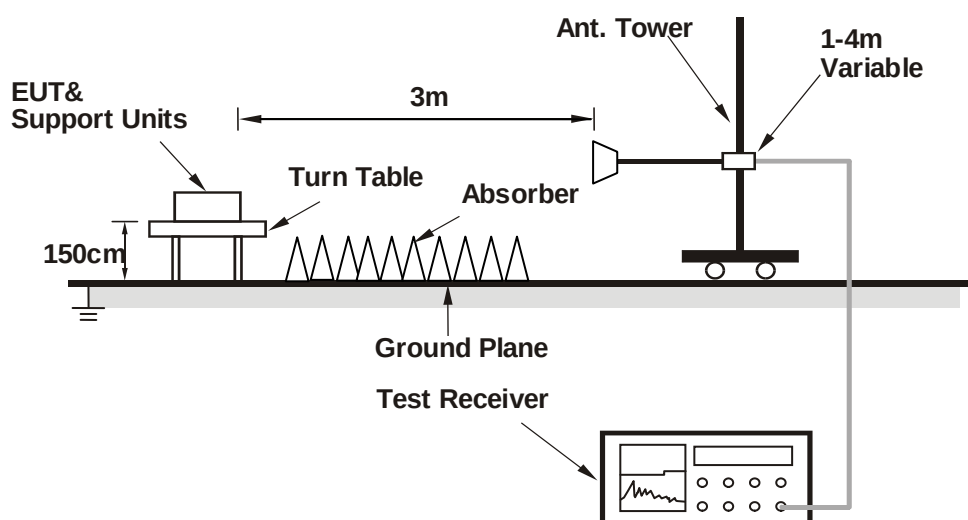
No deviation.

#### 4.7.4 Test Setup

##### <Radiated Emission below or equal 1 GHz>



##### <Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

# 4.7.5 Test Results

WCDMA:

Low Channel

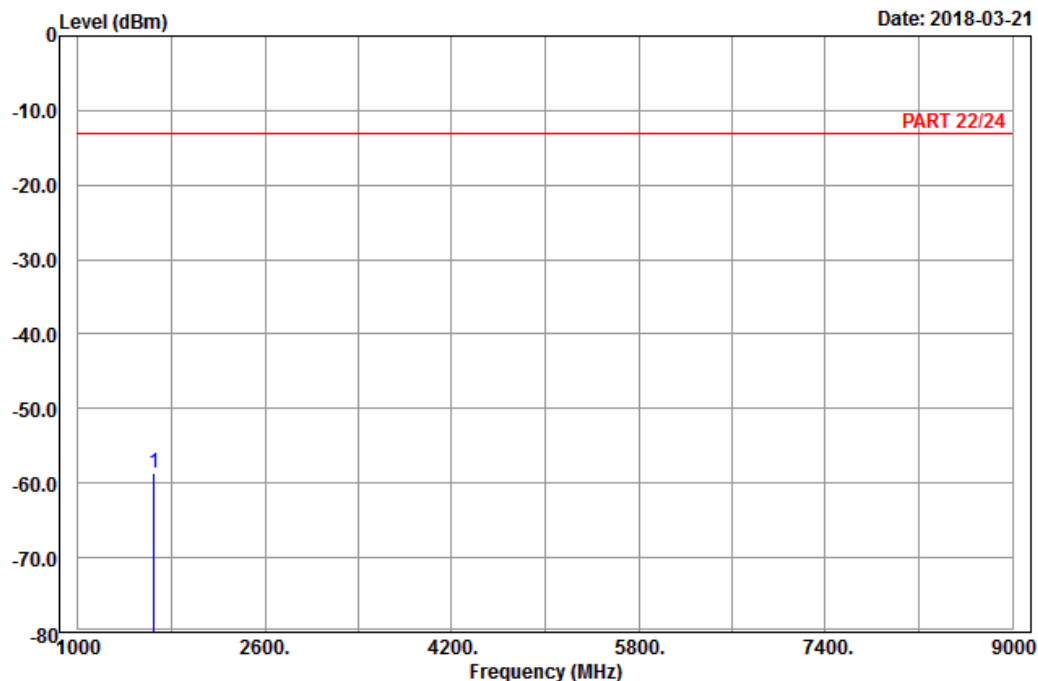


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-03-21



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : Band V\_Link\_CH4132  
Tested by: Karl Lee

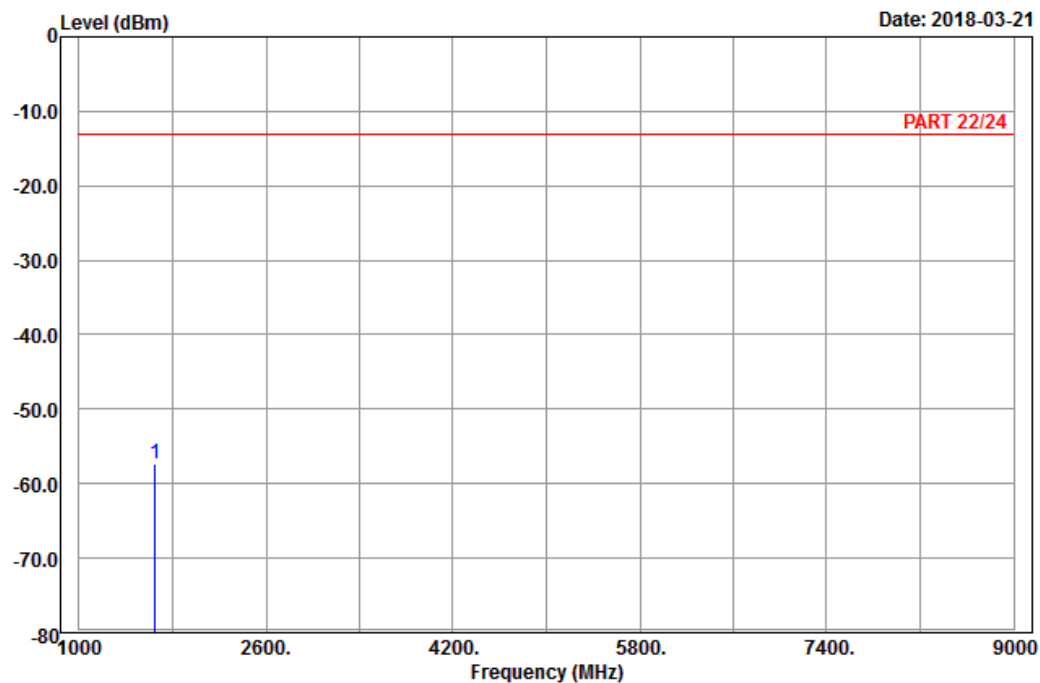
|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1652.80 | -58.74 | -66.47 | -13.00 | -45.74 | 7.73   | Peak   |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : Band V\_Link\_CH4132  
 Tested by: Karl Lee

|              |        |        | Read   | Limit  | Over   |        |  |
|--------------|--------|--------|--------|--------|--------|--------|--|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |  |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |  |
| 1 pp 1652.80 | -57.42 | -65.15 | -13.00 | -44.42 | 7.73   | Peak   |  |

# Middle Channel

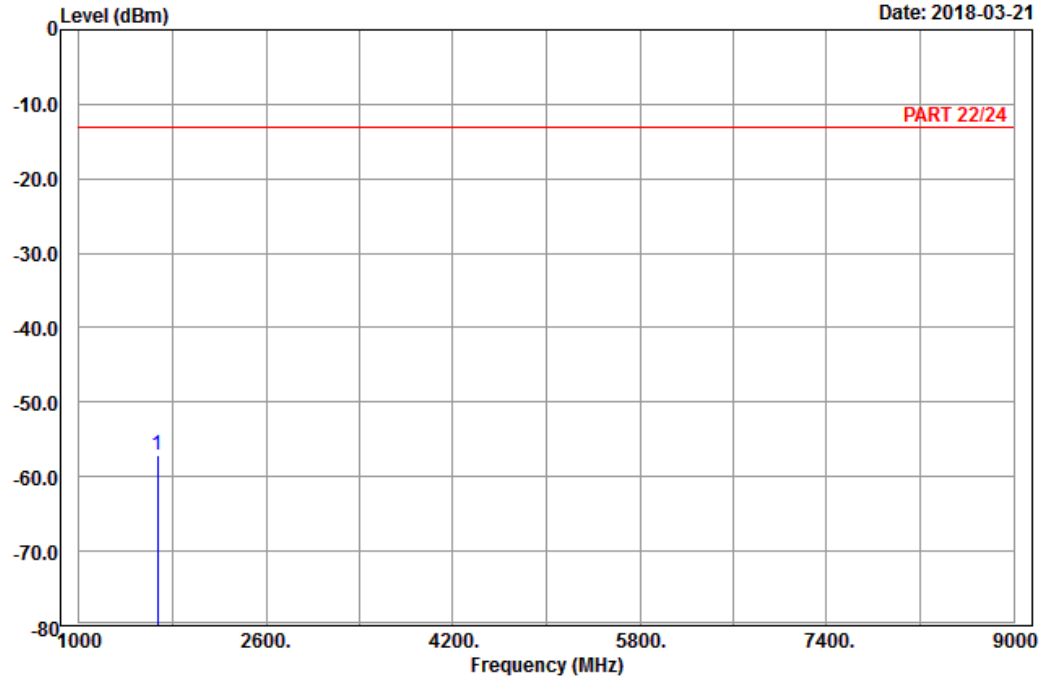


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-03-21



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : Band V\_Link\_CH4182  
Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1672.80 | -57.07 | -64.98 | -13.00 | -44.07 | 7.91   | Peak   |

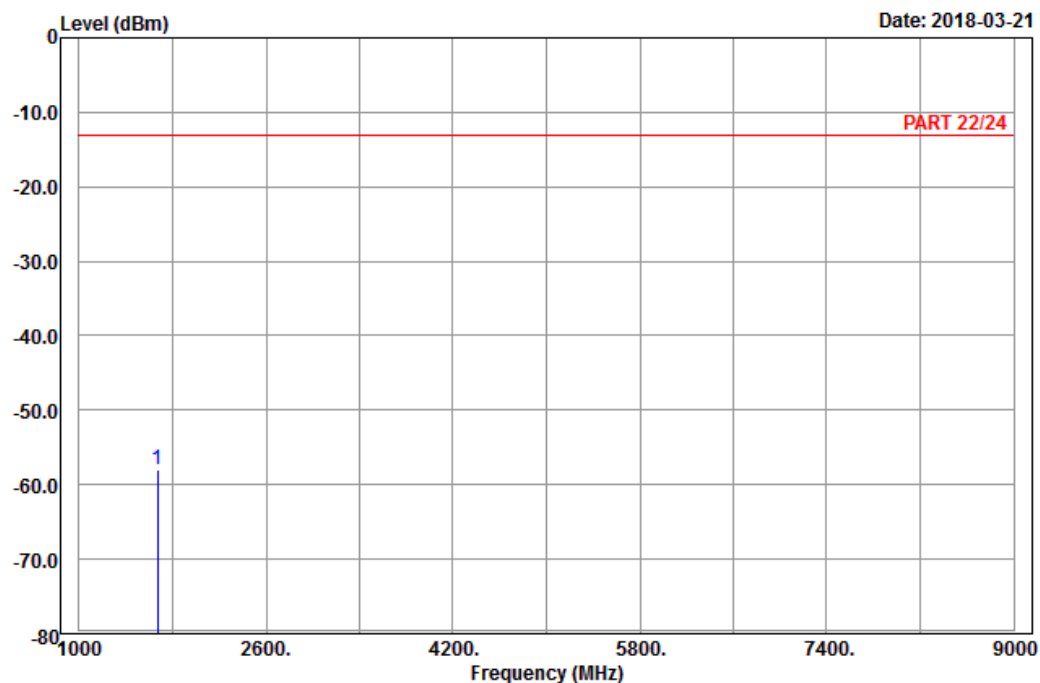


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-21



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : Band V\_Link\_CH4182  
Tested by: Karl Lee

|              |        |        | Read   | Limit  | Over   |        |  |
|--------------|--------|--------|--------|--------|--------|--------|--|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |  |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |  |
| 1 pp 1672.80 | -57.97 | -65.88 | -13.00 | -44.97 | 7.91   | Peak   |  |

## High Channel

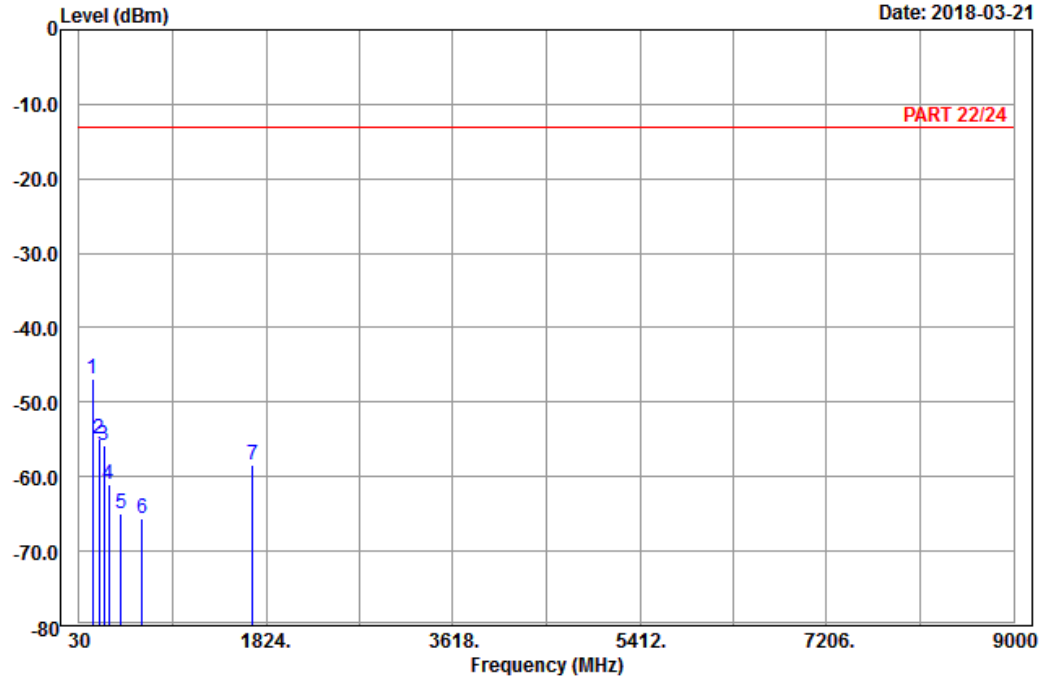


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9

Date: 2018-03-21



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : Band V\_Link\_CH4233  
Tested by: Karl Lee

|      |         | Read   | Limit  | Over   |        |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp | 158.25  | -46.97 | -39.25 | -13.00 | -33.97 | -7.72  | Peak   |
| 2    | 218.46  | -54.83 | -48.89 | -13.00 | -41.83 | -5.94  | Peak   |
| 3    | 270.57  | -55.70 | -50.01 | -13.00 | -42.70 | -5.69  | Peak   |
| 4    | 311.20  | -60.97 | -55.15 | -13.00 | -47.97 | -5.82  | Peak   |
| 5    | 431.60  | -65.02 | -61.58 | -13.00 | -52.02 | -3.44  | Peak   |
| 6    | 631.10  | -65.54 | -65.61 | -13.00 | -52.54 | 0.07   | Peak   |
| 7    | 1693.20 | -58.37 | -66.51 | -13.00 | -45.37 | 8.14   | Peak   |

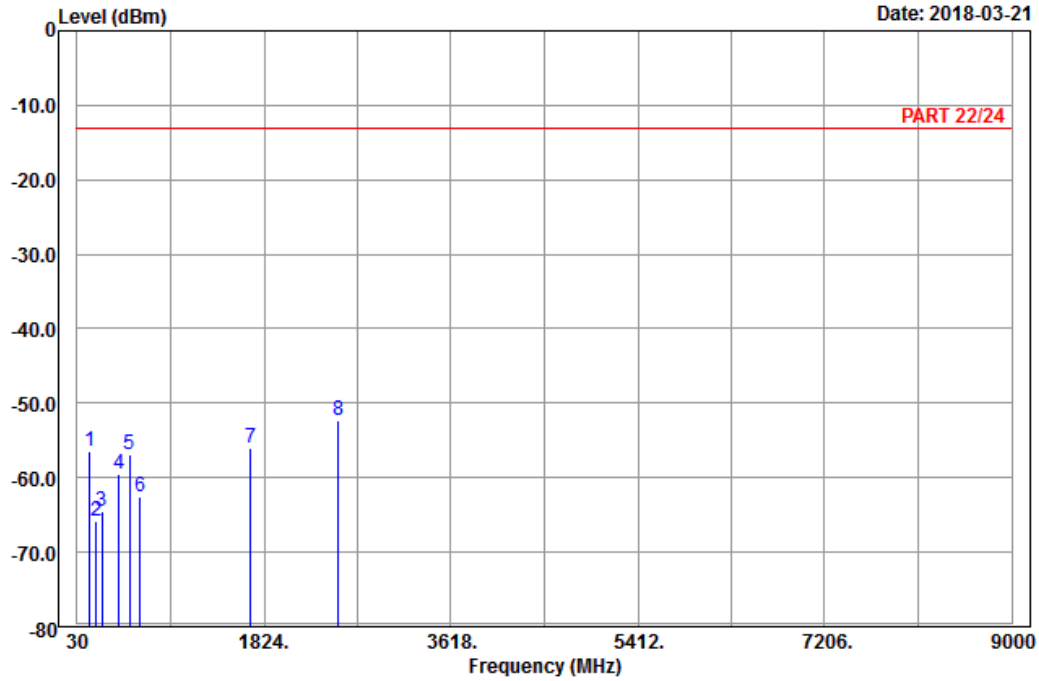


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2018-03-21



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : Band V\_Link\_CH4233  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1    | 152.04  | -56.48 | -48.59     | -13.00     | -43.48     | -7.89  | Peak   |
| 2    | 211.98  | -65.81 | -59.80     | -13.00     | -52.81     | -6.01  | Peak   |
| 3    | 271.38  | -64.62 | -58.92     | -13.00     | -51.62     | -5.70  | Peak   |
| 4    | 432.30  | -59.61 | -56.15     | -13.00     | -46.61     | -3.46  | Peak   |
| 5    | 533.10  | -57.00 | -54.13     | -13.00     | -44.00     | -2.87  | Peak   |
| 6    | 631.10  | -62.52 | -62.59     | -13.00     | -49.52     | 0.07   | Peak   |
| 7    | 1693.20 | -55.98 | -64.12     | -13.00     | -42.98     | 8.14   | Peak   |
| 8 pp | 2539.80 | -52.27 | -63.74     | -13.00     | -39.27     | 11.47  | Peak   |

LTE Band 5  
Channel Bandwidth: 1.4 MHz / QPSK  
Low Channel

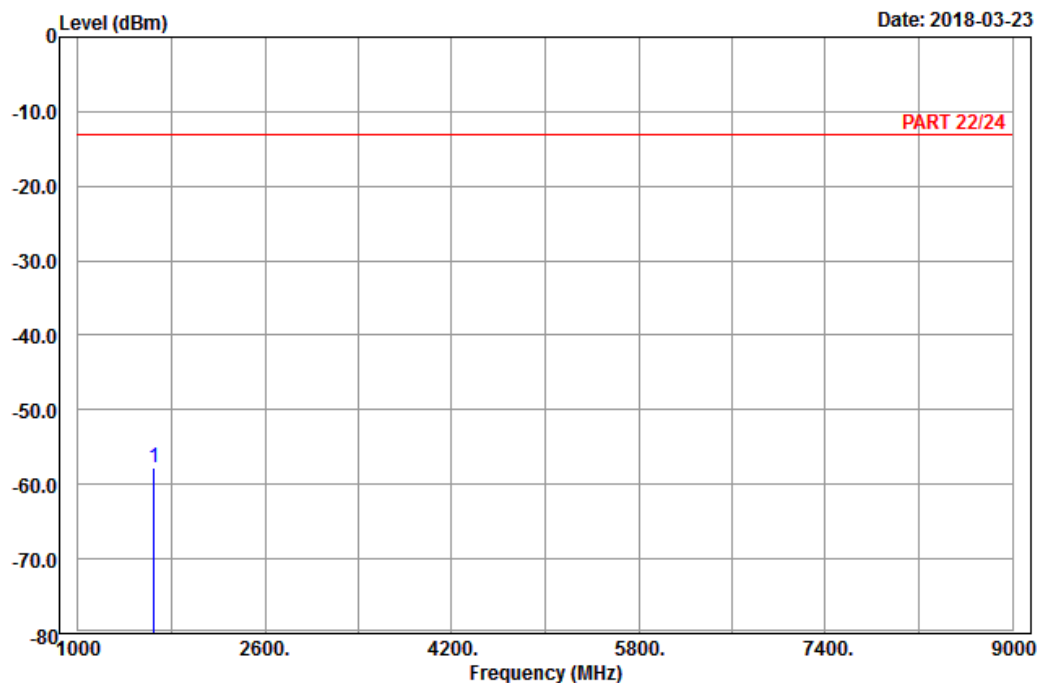


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 5\_Link\_CH20407  
Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1649.40 | -57.68 | -65.41 | -13.00 | -44.68 | 7.73   | Peak   |

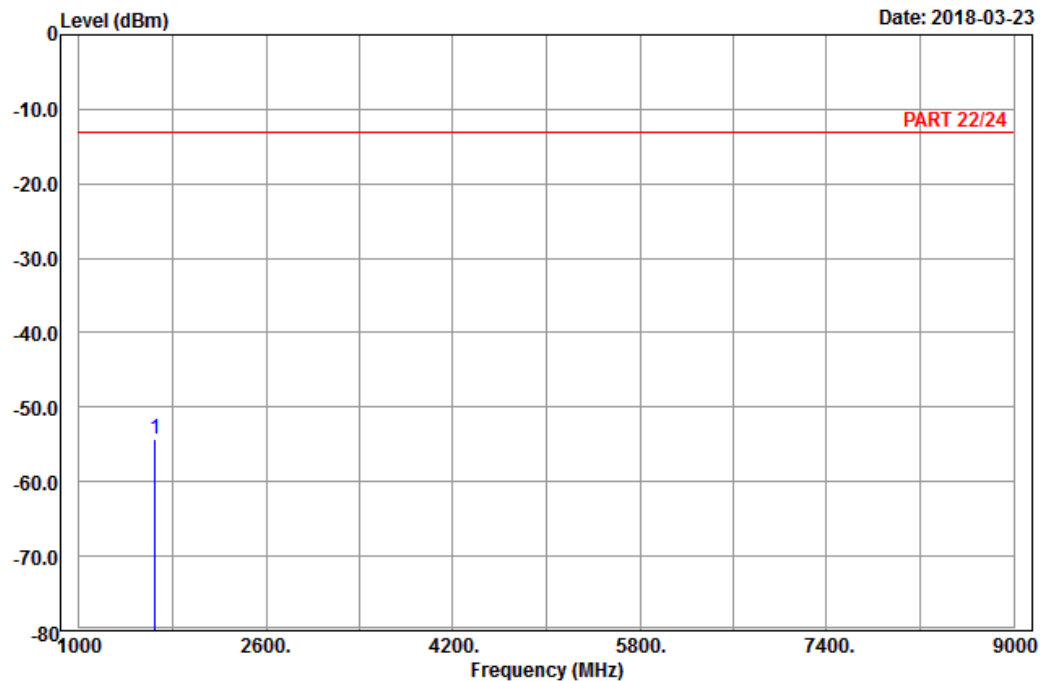


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 5\_Link\_CH20407  
Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1649.40 | -54.22 | -61.95 | -13.00 | -41.22 | 7.73   | Peak   |

# Middle Channel

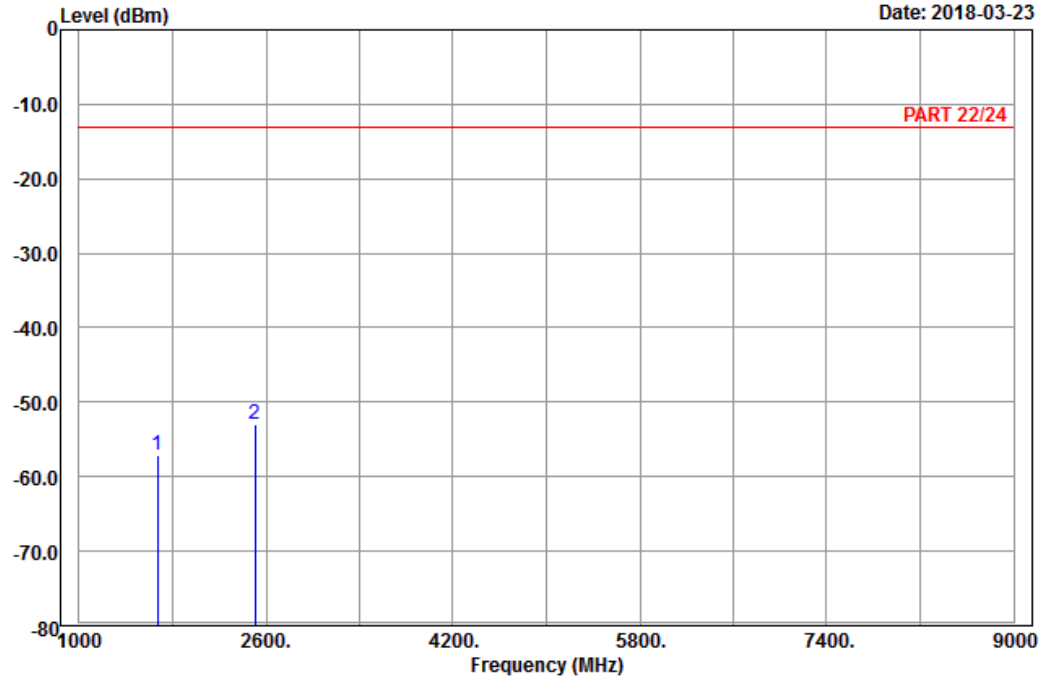


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 5\_Link\_CH20525  
Tested by: Karl Lee

|      |         | Read   | Limit  | Over   |        |            |
|------|---------|--------|--------|--------|--------|------------|
| Freq | Level   | Level  | Line   | Limit  | Factor | Remark     |
| MHz  | dBm     | dBm    | dBm    | dB     | dB     |            |
| 1    | 1673.00 | -57.10 | -65.01 | -13.00 | -44.10 | 7.91 Peak  |
| 2 pp | 2509.50 | -52.97 | -64.25 | -13.00 | -39.97 | 11.28 Peak |

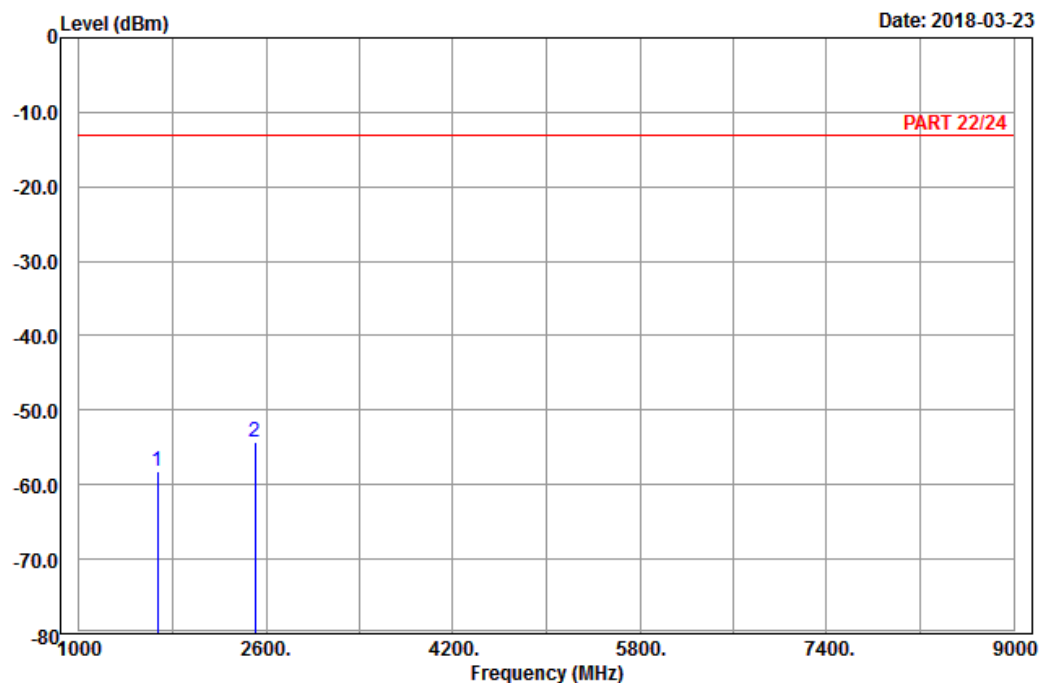


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 5\_Link\_CH20525  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1    | 1673.00 | -58.21 | -66.12     | -13.00     | -45.21     | 7.91   | Peak   |
| 2 pp | 2509.50 | -54.22 | -65.50     | -13.00     | -41.22     | 11.28  | Peak   |

## High Channel

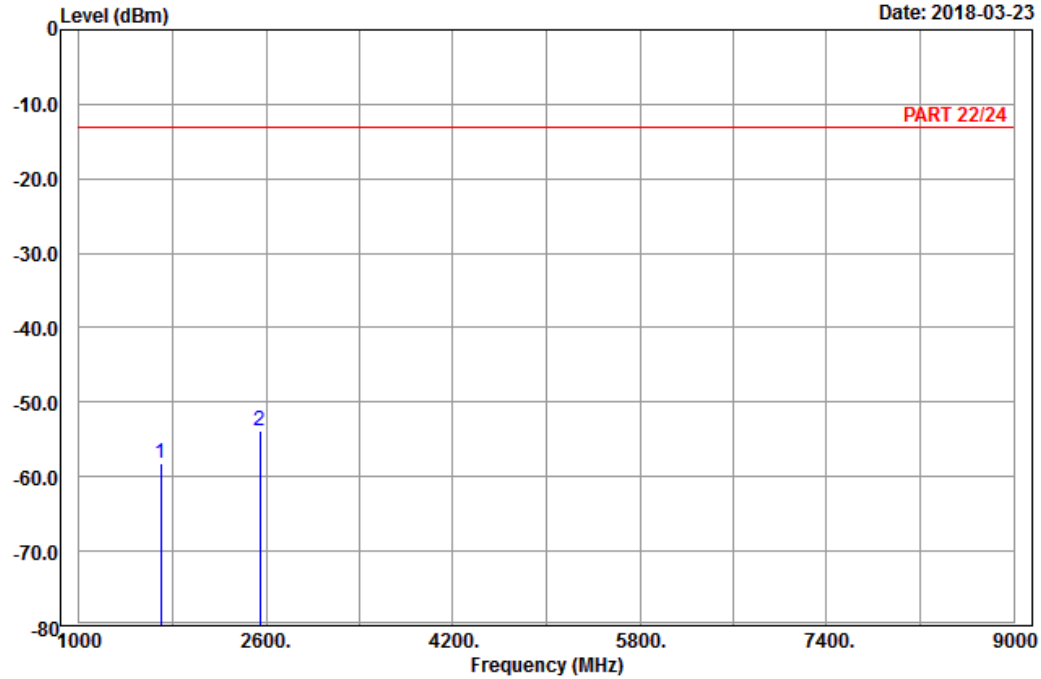


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 5\_Link\_CH20625  
Tested by: Karl Lee

|      |         | Read   | Limit  | Over   |        |            |
|------|---------|--------|--------|--------|--------|------------|
| Freq | Level   | Level  | Line   | Limit  | Factor | Remark     |
| MHz  | dBm     | dBm    | dBm    | dB     | dB     |            |
| 1    | 1696.60 | -58.20 | -66.34 | -13.00 | -45.20 | 8.14 Peak  |
| 2 pp | 2544.90 | -53.82 | -65.29 | -13.00 | -40.82 | 11.47 Peak |

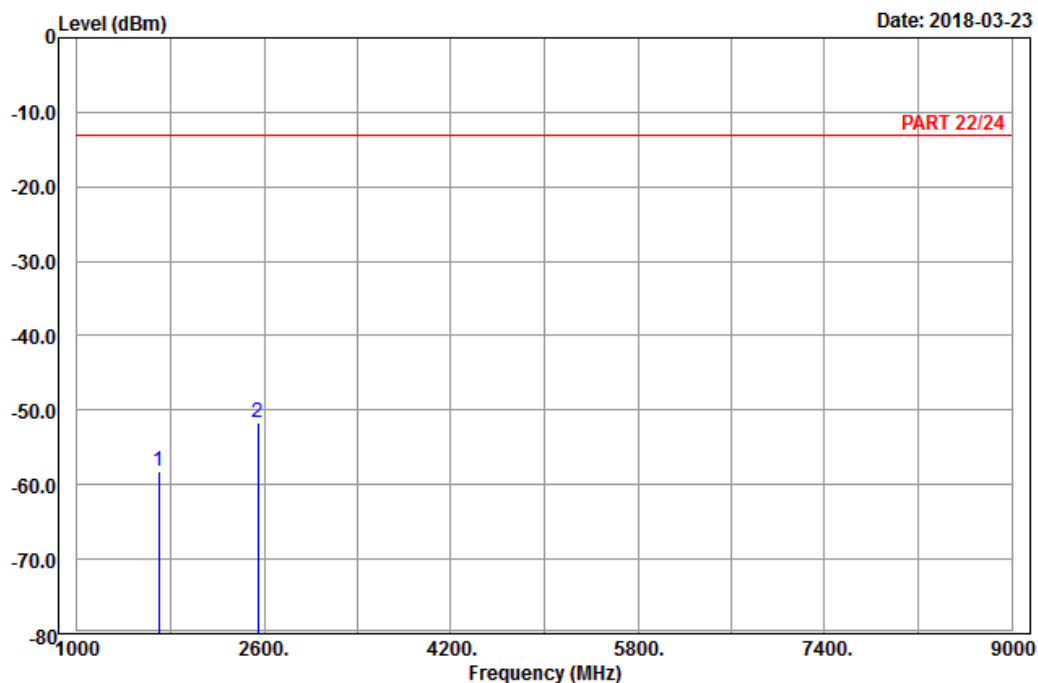


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 5\_Link\_CH20625  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1    | 1696.60 | -58.11 | -66.25     | -13.00     | -45.11     | 8.14   | Peak   |
| 2 pp | 2544.90 | -51.67 | -63.14     | -13.00     | -38.67     | 11.47  | Peak   |

Channel Bandwidth: 5 MHz / QPSK  
Low Channel

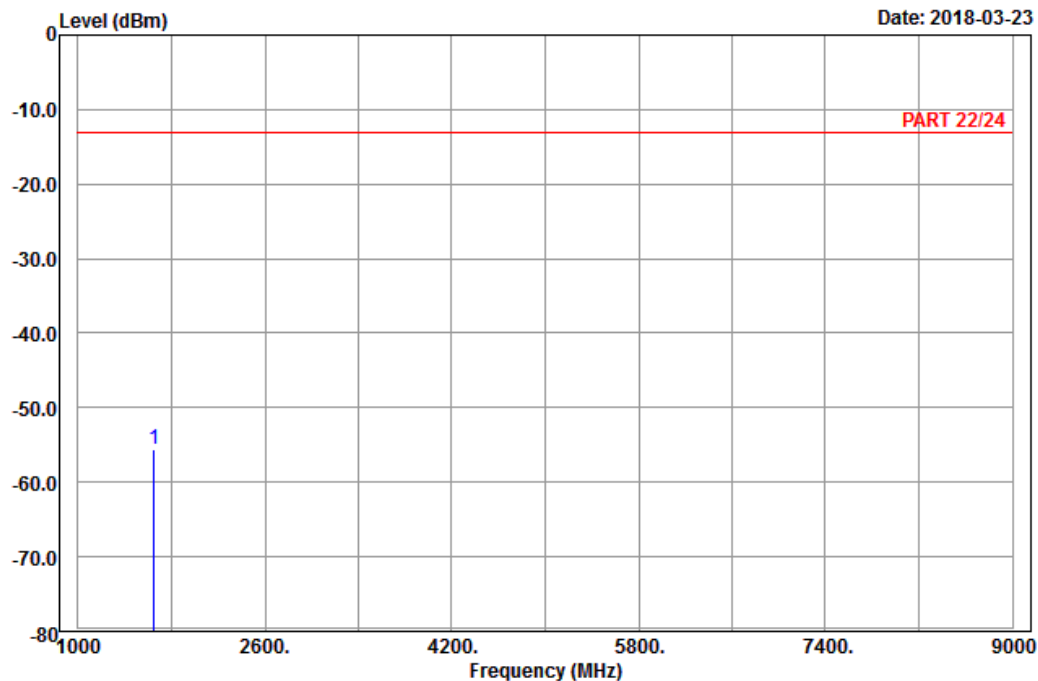


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 5\_Link\_CH20425  
Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1653.00 | -55.52 | -63.25 | -13.00 | -42.52 | 7.73   | Peak   |

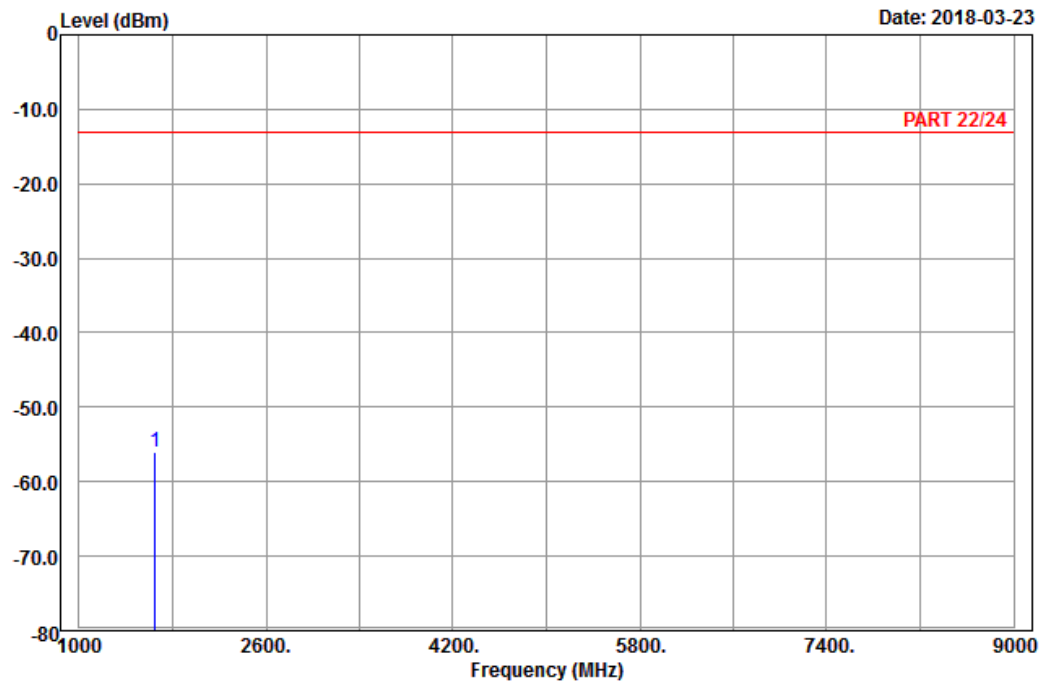


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 5\_Link\_CH20425  
Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1653.00 | -55.96 | -63.69 | -13.00 | -42.96 | 7.73   | Peak   |

# Middle Channel

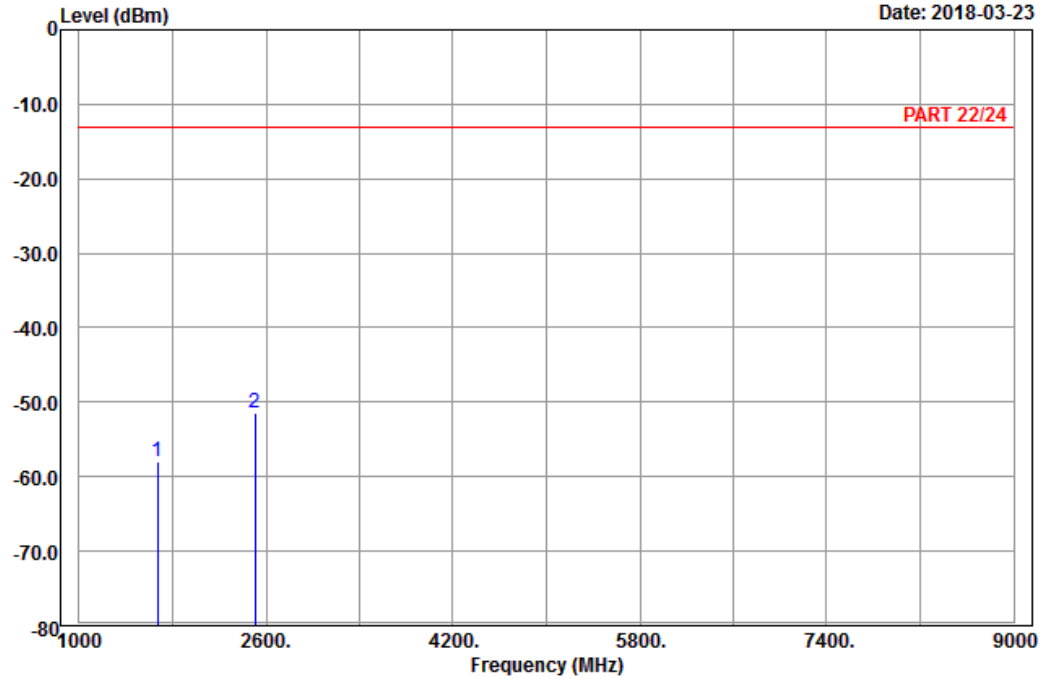


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 5\_Link\_CH20525  
Tested by: Karl Lee

|      |         | Read   | Limit  | Over   |        |            |
|------|---------|--------|--------|--------|--------|------------|
| Freq | Level   | Level  | Line   | Limit  | Factor | Remark     |
| MHz  | dBm     | dBm    | dBm    | dB     | dB     |            |
| 1    | 1673.00 | -57.97 | -65.88 | -13.00 | -44.97 | 7.91 Peak  |
| 2 pp | 2509.50 | -51.42 | -62.70 | -13.00 | -38.42 | 11.28 Peak |

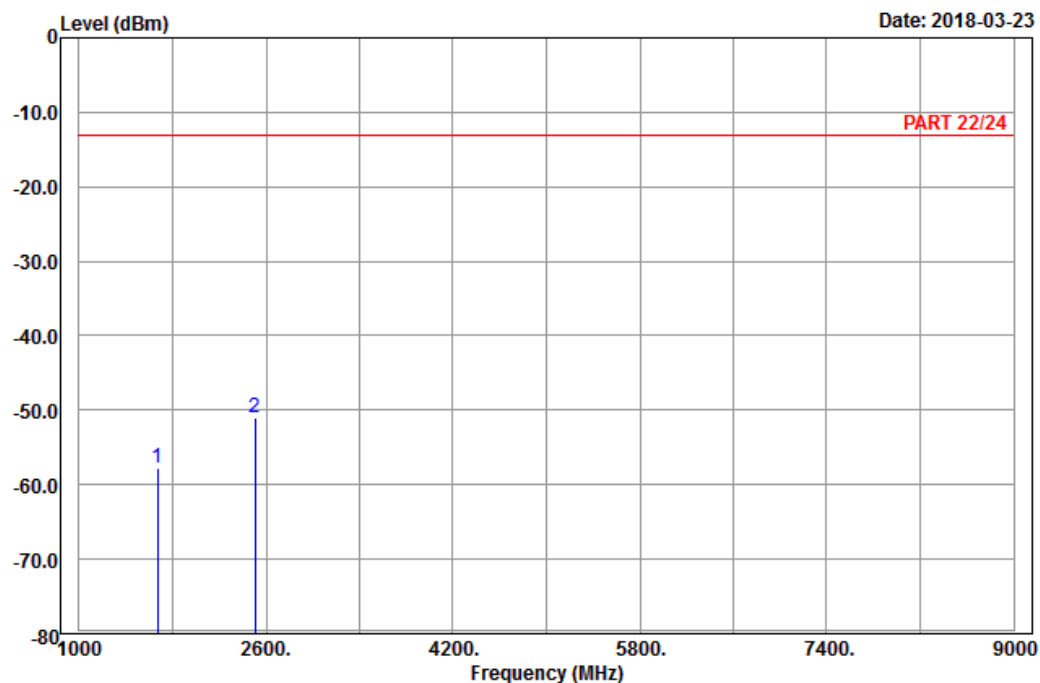


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 5\_Link\_CH20525  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1    | 1673.00 | -57.75 | -65.66     | -13.00     | -44.75     | 7.91   | Peak   |
| 2 pp | 2509.50 | -51.09 | -62.37     | -13.00     | -38.09     | 11.28  | Peak   |

# High Channel

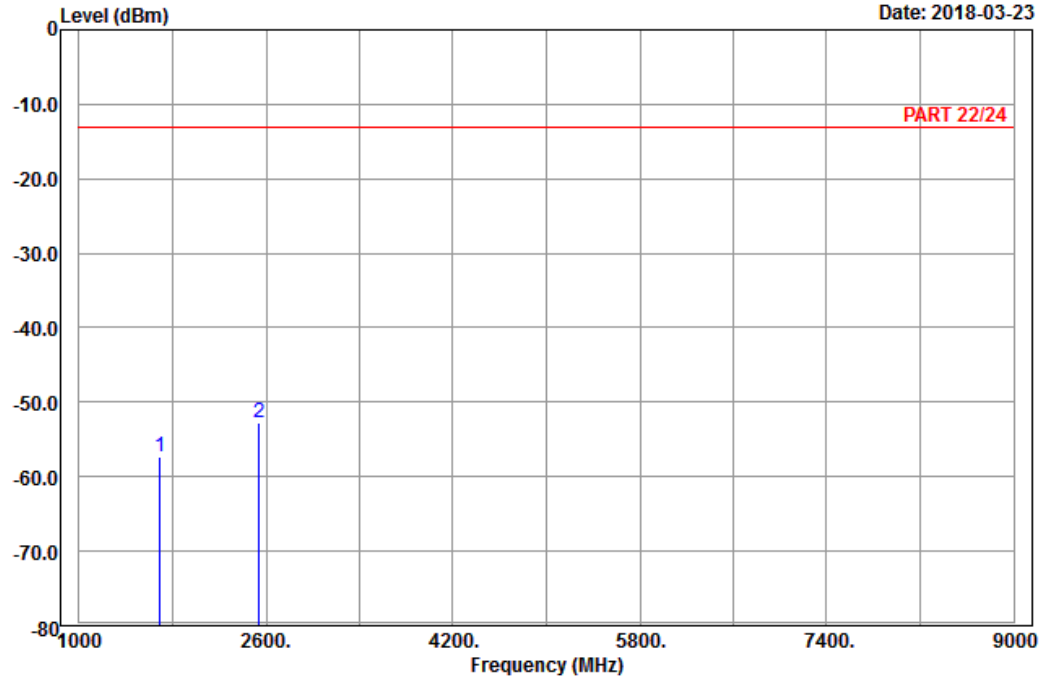


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 5\_Link\_CH20625  
Tested by: Karl Lee

|      |         | Read   | Limit  | Over   |        |            |
|------|---------|--------|--------|--------|--------|------------|
| Freq | Level   | Level  | Line   | Limit  | Factor | Remark     |
| MHz  | dBm     | dBm    | dBm    | dB     | dB     |            |
| 1    | 1693.00 | -57.38 | -65.40 | -13.00 | -44.38 | 8.02 Peak  |
| 2 pp | 2539.50 | -52.70 | -64.17 | -13.00 | -39.70 | 11.47 Peak |

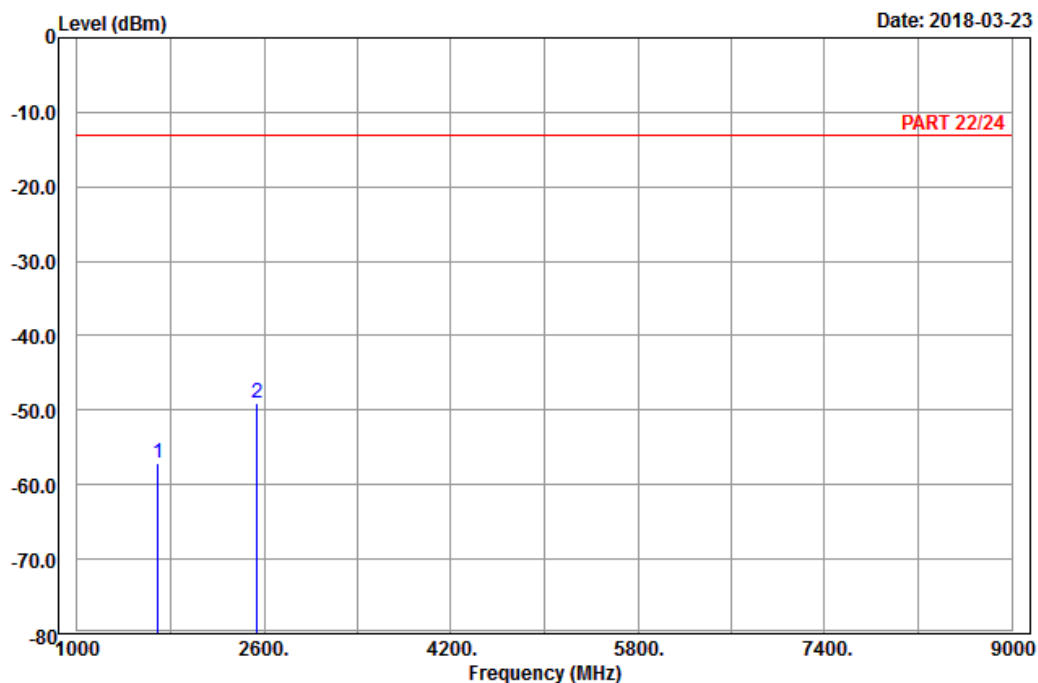


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 5\_Link\_CH20625  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1    | 1693.00 | -57.05 | -65.07     | -13.00     | -44.05     | 8.02   | Peak   |
| 2 pp | 2539.50 | -48.97 | -60.44     | -13.00     | -35.97     | 11.47  | Peak   |

Channel Bandwidth: 10 MHz / QPSK

Low Channel

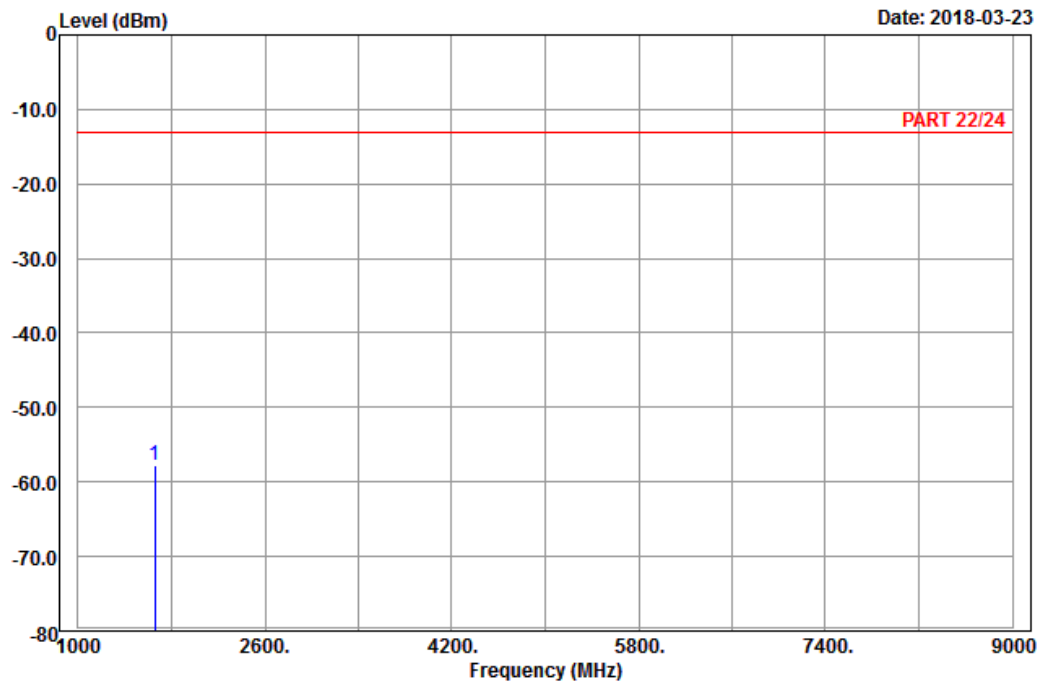


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2018-03-23



Site : 966 chamber 1

Condition: PART 22/24 Horizontal

Remark : LTE\_Band 5\_Link\_CH20450

Tested by: Charles Hsiao

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1658.00 | -57.84 | -65.75 | -13.00 | -44.84 | 7.91   | Peak   |

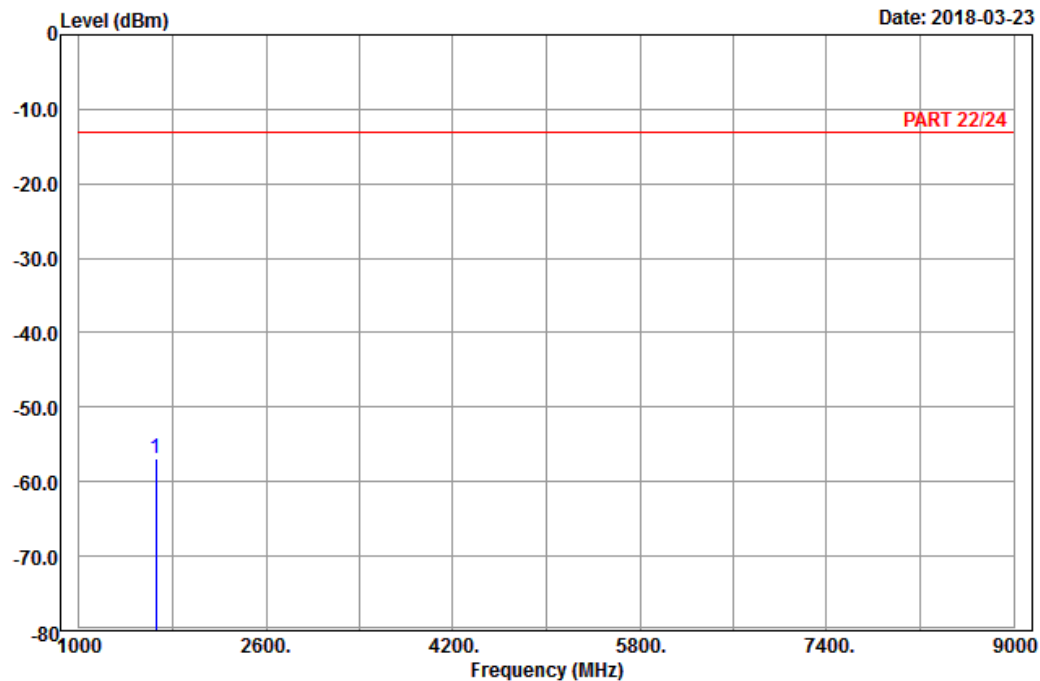


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 5\_Link\_CH20450  
Tested by: Charles Hsiao

|              |        |        | Read   | Limit  | Over   |        |  |
|--------------|--------|--------|--------|--------|--------|--------|--|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |  |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |  |
| 1 pp 1658.00 | -56.82 | -64.73 | -13.00 | -43.82 | 7.91   | Peak   |  |

## Middle Channel

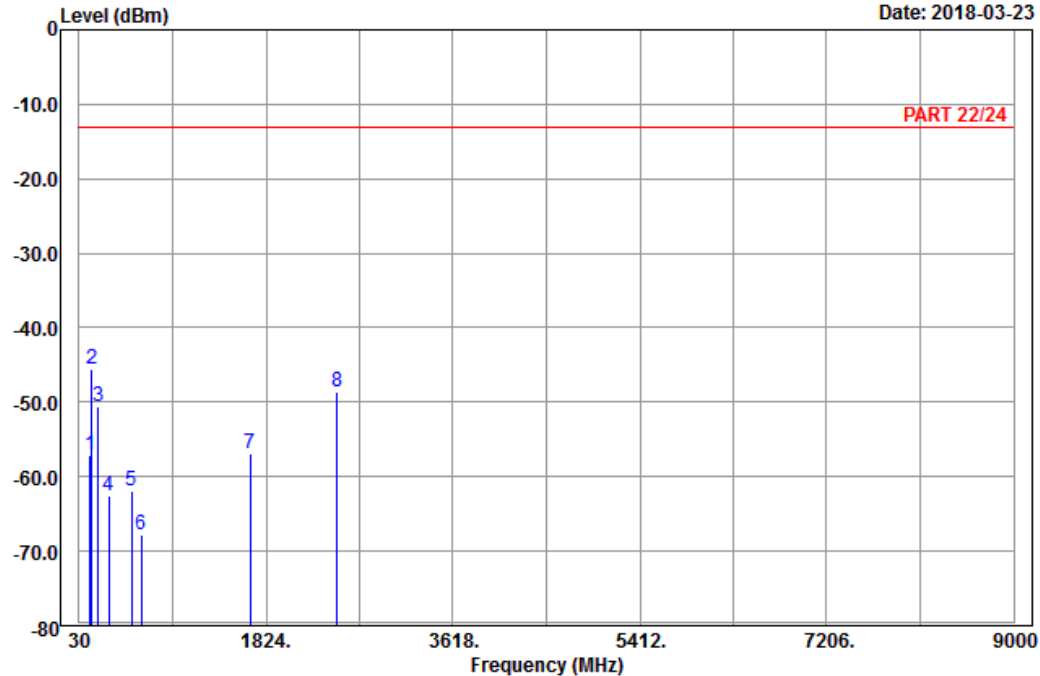


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 5\_Link\_CH20525  
Tested by: Charles Hsiao

|   |           |        | Read   | Limit  | Over   |        |        |
|---|-----------|--------|--------|--------|--------|--------|--------|
|   | Freq      | Level  | Level  | Line   | Limit  | Factor | Remark |
|   | MHz       | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 | 133.41    | -57.02 | -49.36 | -13.00 | -44.02 | -7.66  | Peak   |
| 2 | pp 153.12 | -45.62 | -37.76 | -13.00 | -32.62 | -7.86  | Peak   |
| 3 | 213.87    | -50.60 | -44.61 | -13.00 | -37.60 | -5.99  | Peak   |
| 4 | 312.60    | -62.49 | -56.68 | -13.00 | -49.49 | -5.81  | Peak   |
| 5 | 532.40    | -61.99 | -59.05 | -13.00 | -48.99 | -2.94  | Peak   |
| 6 | 630.40    | -67.89 | -67.98 | -13.00 | -54.89 | 0.09   | Peak   |
| 7 | 1673.00   | -56.97 | -64.88 | -13.00 | -43.97 | 7.91   | Peak   |
| 8 | 2509.50   | -48.68 | -59.96 | -13.00 | -35.68 | 11.28  | Peak   |

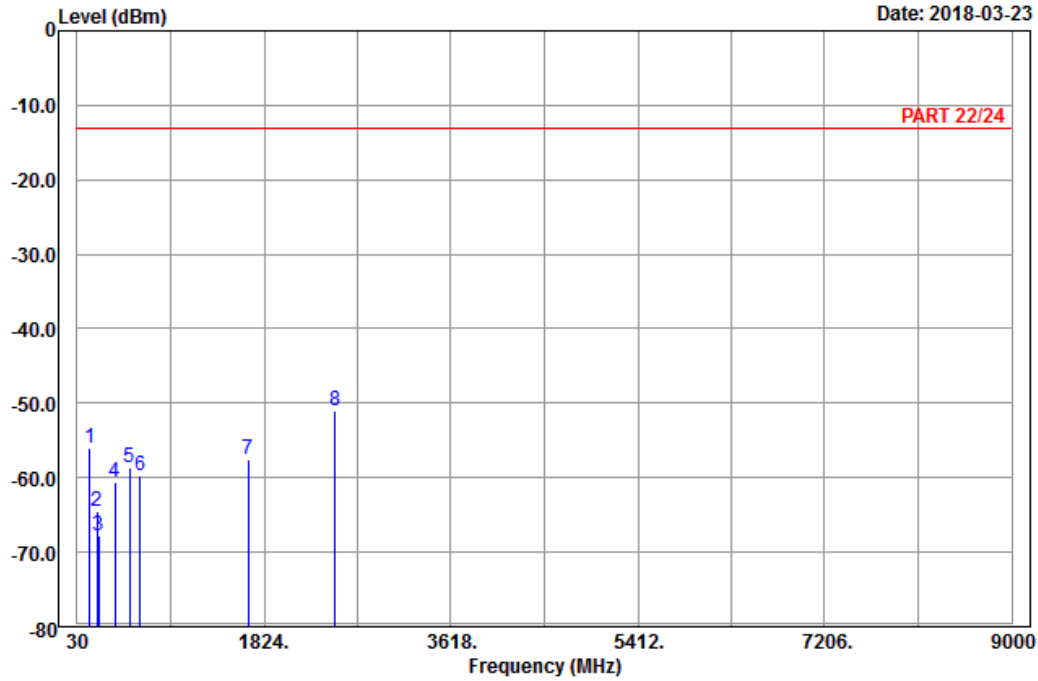


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 5\_Link\_CH20525  
Tested by: Charles Hsiao

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1    | 152.31  | -55.99 | -48.10     | -13.00     | -42.99     | -7.89  | Peak   |
| 2    | 217.65  | -64.61 | -58.66     | -13.00     | -51.61     | -5.95  | Peak   |
| 3    | 233.58  | -67.69 | -61.96     | -13.00     | -54.69     | -5.73  | Peak   |
| 4    | 396.60  | -60.54 | -57.64     | -13.00     | -47.54     | -2.90  | Peak   |
| 5    | 532.40  | -58.55 | -55.61     | -13.00     | -45.55     | -2.94  | Peak   |
| 6    | 631.10  | -59.73 | -59.80     | -13.00     | -46.73     | 0.07   | Peak   |
| 7    | 1673.00 | -57.62 | -65.53     | -13.00     | -44.62     | 7.91   | Peak   |
| 8 pp | 2509.50 | -51.07 | -62.35     | -13.00     | -38.07     | 11.28  | Peak   |

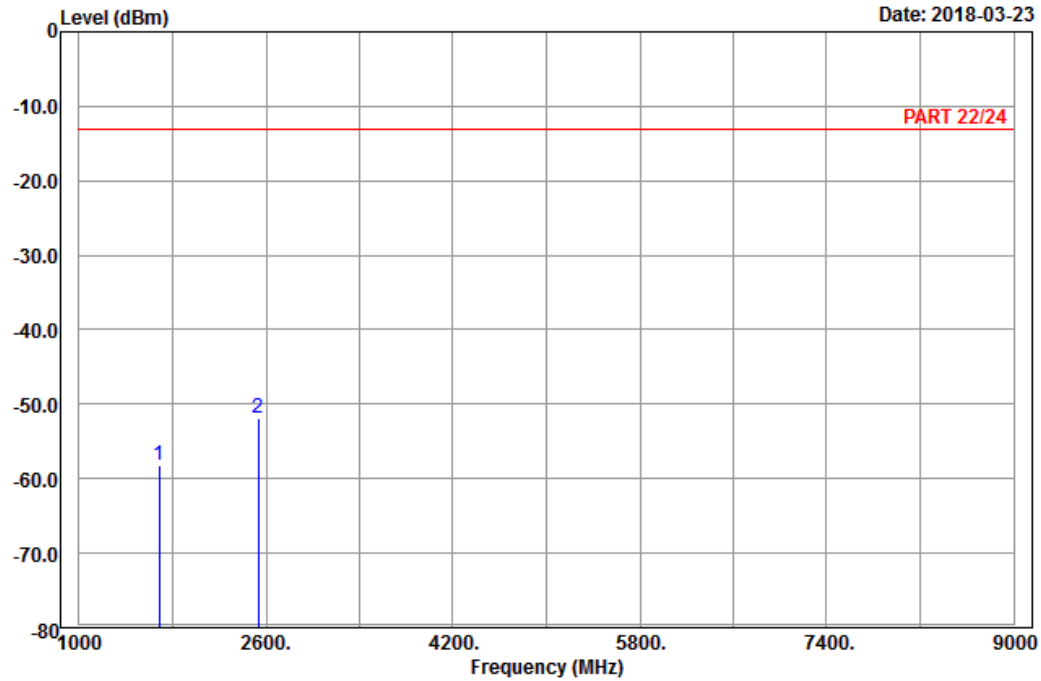
## High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 5\_Link\_CH20600  
 Tested by: Charles Hsiao

|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1    | 1688.00 | -58.22 | -66.24 | -13.00 | -45.22 | 8.02   | Peak   |
| 2 pp | 2532.00 | -51.87 | -63.25 | -13.00 | -38.87 | 11.38  | Peak   |

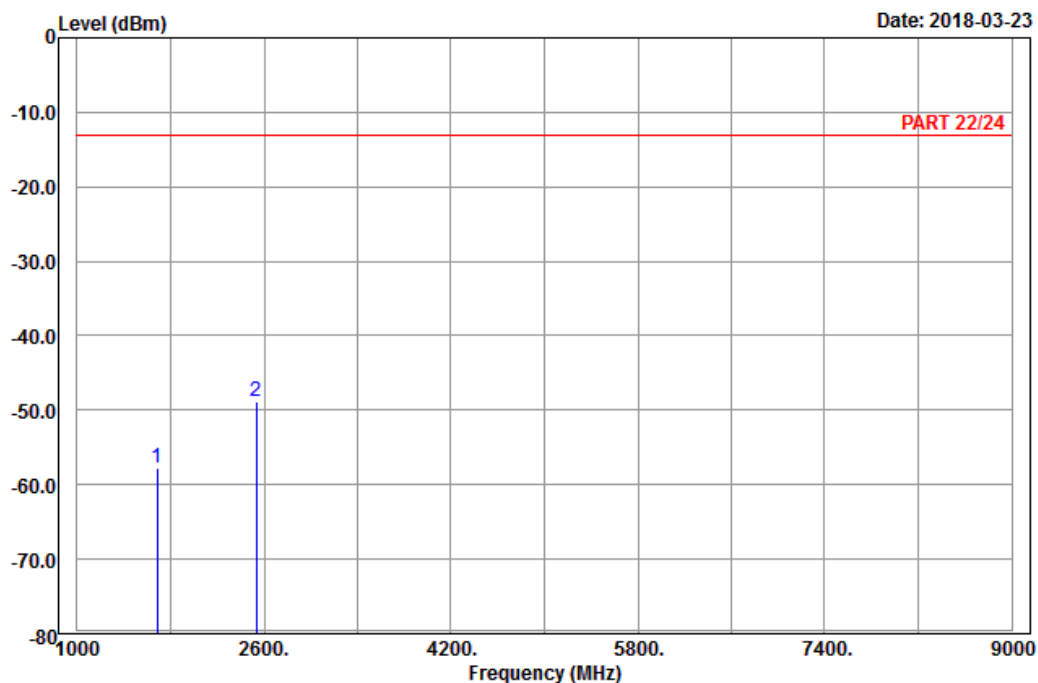


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 5\_Link\_CH20600  
Tested by: Charles Hsiao

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1    | 1688.00 | -57.76 | -65.78     | -13.00     | -44.76     | 8.02   | Peak   |
| 2 pp | 2532.00 | -48.79 | -60.17     | -13.00     | -35.79     | 11.38  | Peak   |

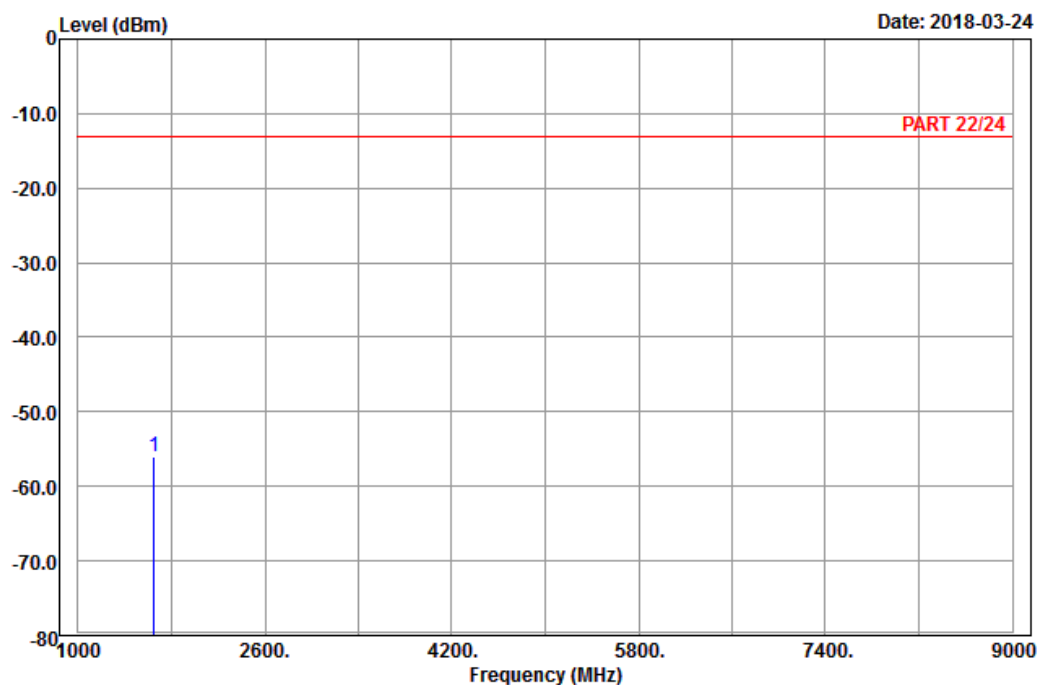
LTE Band 26  
Channel Bandwidth: 1.4 MHz / QPSK  
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 26\_Link\_CH26797  
Tested by: Karl Lee

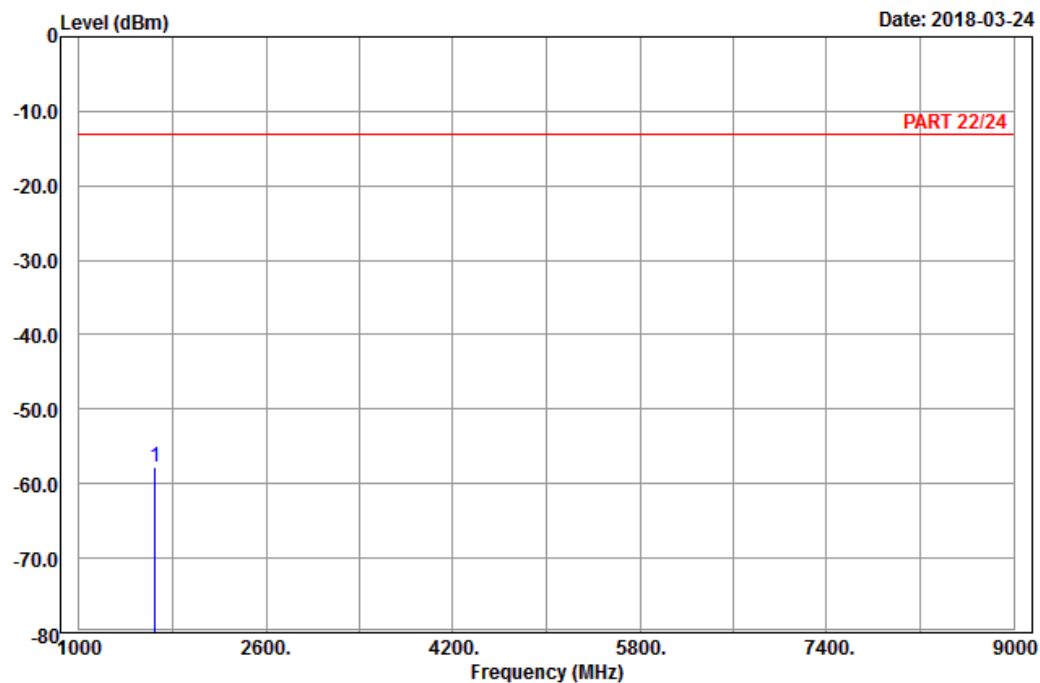
|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1649.40 | -56.01 | -63.74 | -13.00 | -43.01 | 7.73   | Peak   |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26797  
 Tested by: Karl Lee

|              |        |        | Read   | Limit  | Over   |        |  |
|--------------|--------|--------|--------|--------|--------|--------|--|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |  |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |  |
| 1 pp 1649.40 | -57.78 | -65.51 | -13.00 | -44.78 | 7.73   | Peak   |  |

# Middle Channel

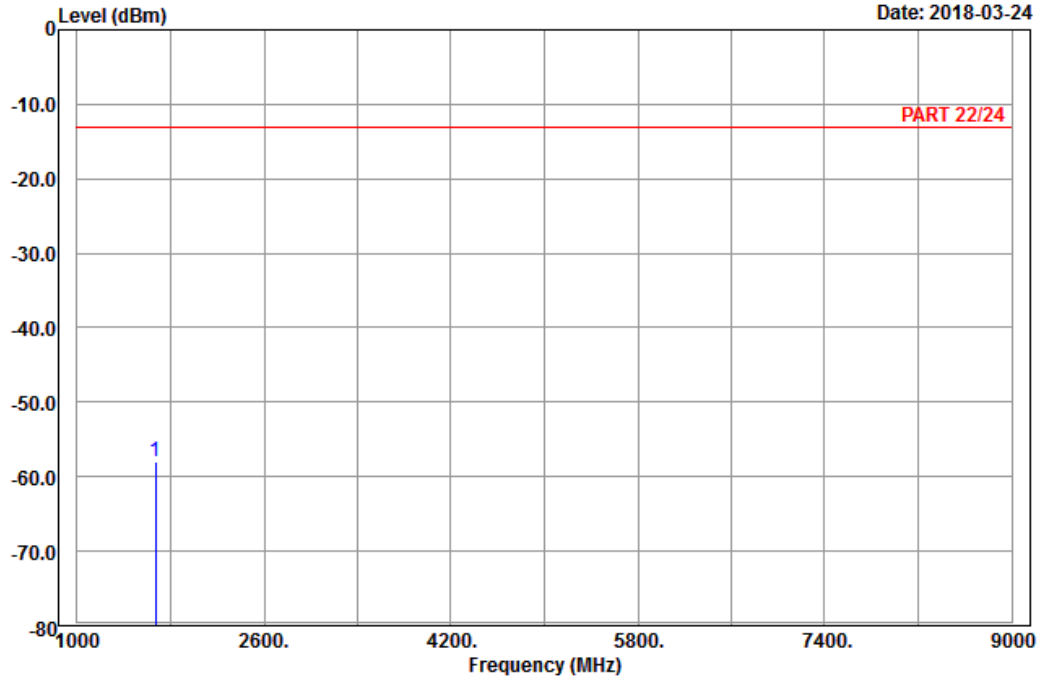


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2018-03-24



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 26\_Link\_CH26915  
Tested by: Karl Lee

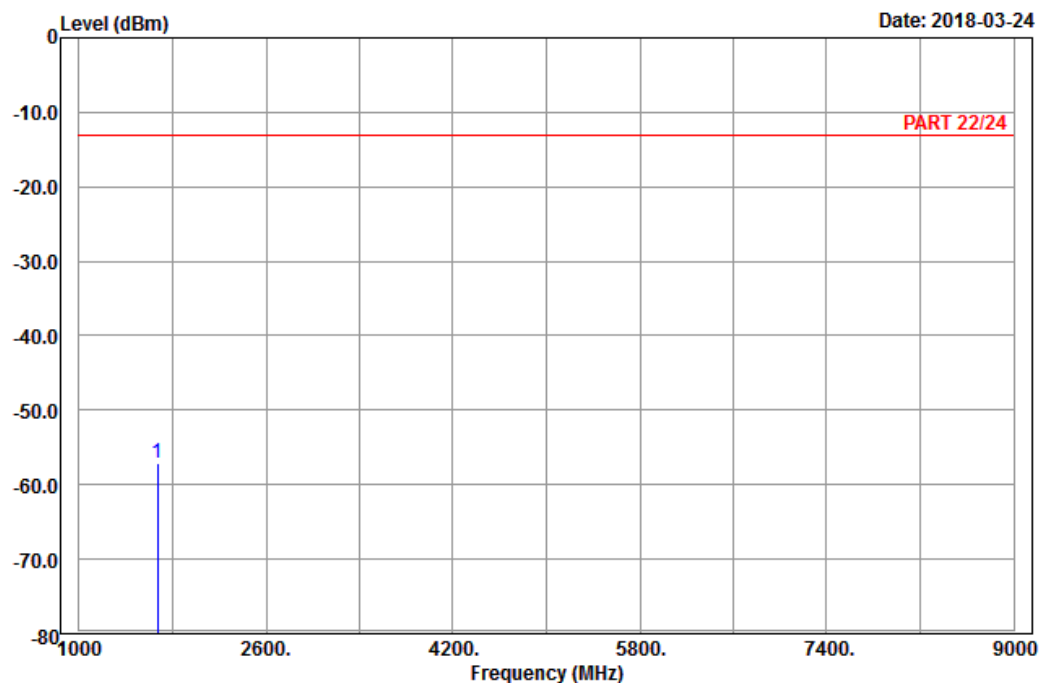
|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1673.00 | -57.99 | -65.90 | -13.00 | -44.99 | 7.91   | Peak   |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1673.00 | -57.05 | -64.96 | -13.00 | -44.05 | 7.91   | Peak   |

## High Channel

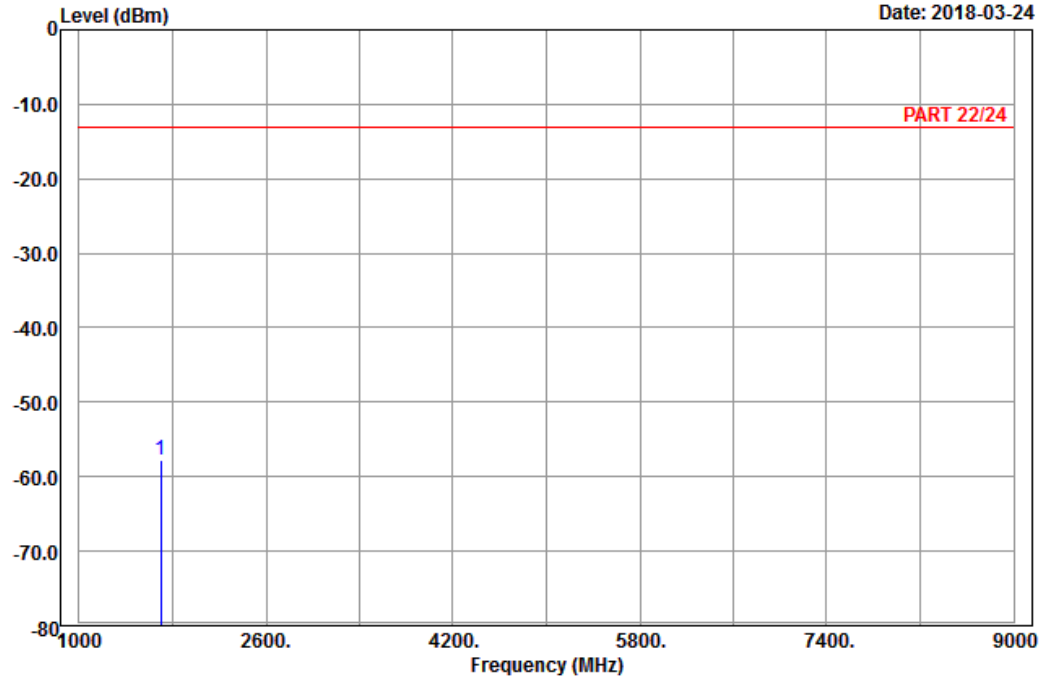


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2018-03-24



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 26\_Link\_CH27015  
Tested by: Karl Lee

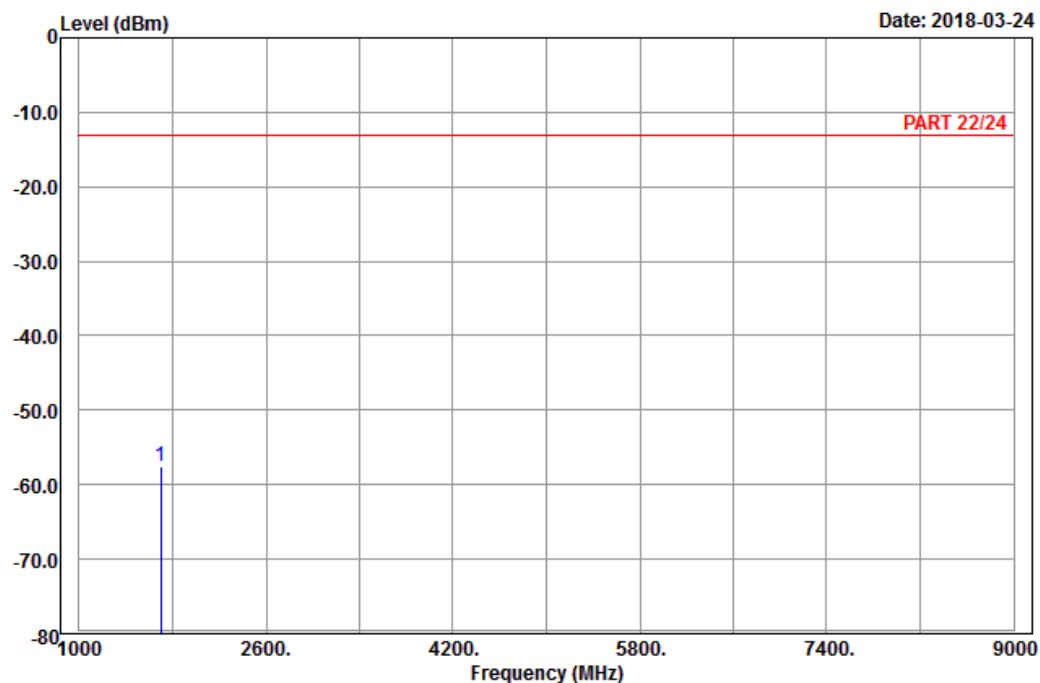
|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1696.60 | -57.87 | -66.01 | -13.00 | -44.87 | 8.14   | Peak   |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH27015  
 Tested by: Karl Lee

|              |        |        | Read   | Limit  | Over   |        |  |
|--------------|--------|--------|--------|--------|--------|--------|--|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |  |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |  |
| 1 pp 1696.60 | -57.62 | -65.76 | -13.00 | -44.62 | 8.14   | Peak   |  |

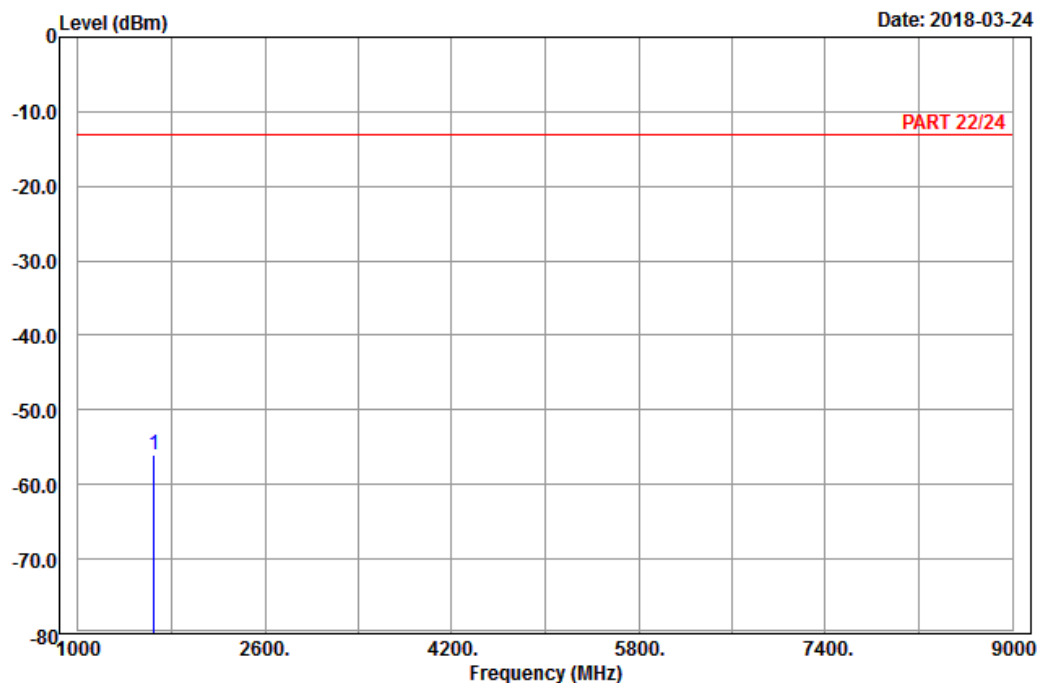
Channel Bandwidth: 5 MHz / QPSK  
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 26\_Link\_CH26815  
Tested by: Karl Lee

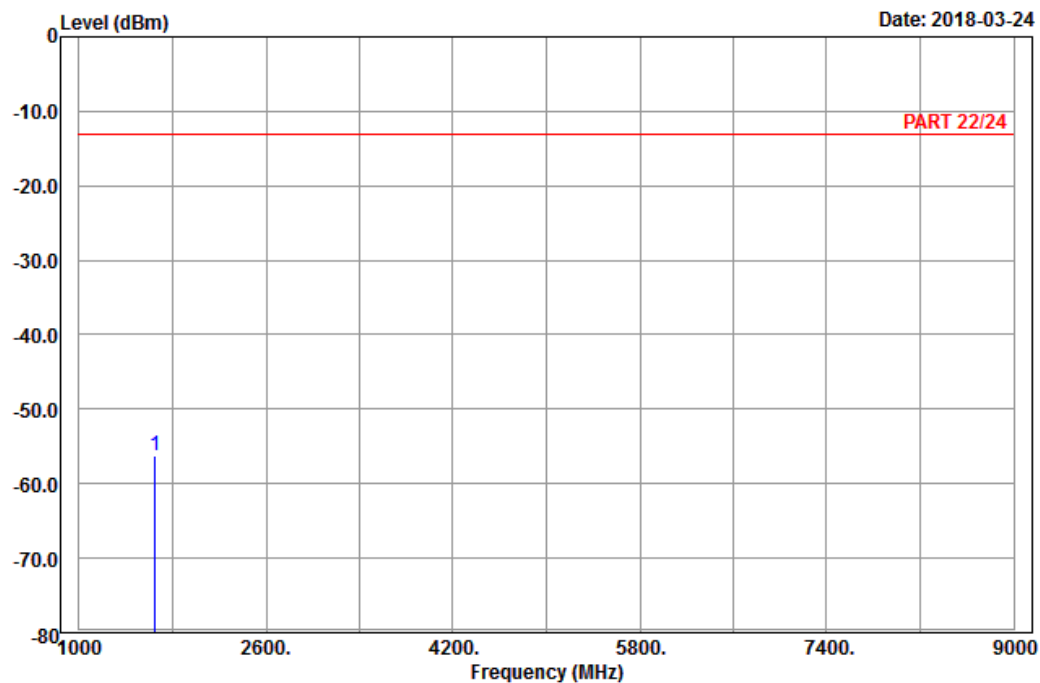
|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1653.00 | -55.92 | -63.65 | -13.00 | -42.92 | 7.73   | Peak   |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 26\_Link\_CH26815  
Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1653.00 | -56.22 | -63.95 | -13.00 | -43.22 | 7.73   | Peak   |

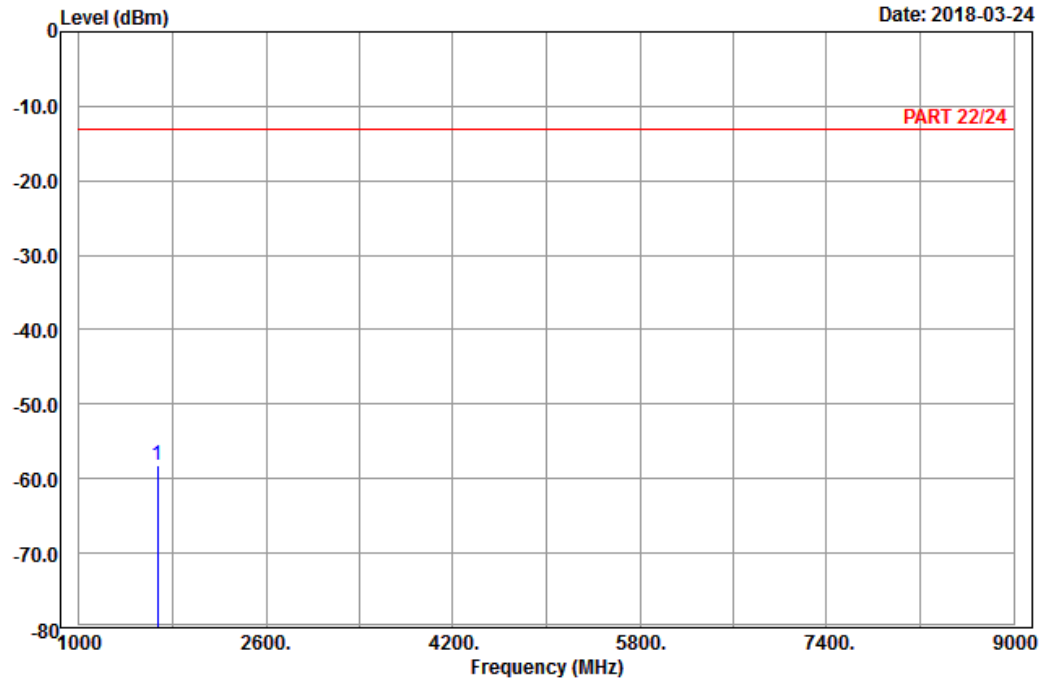
## Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

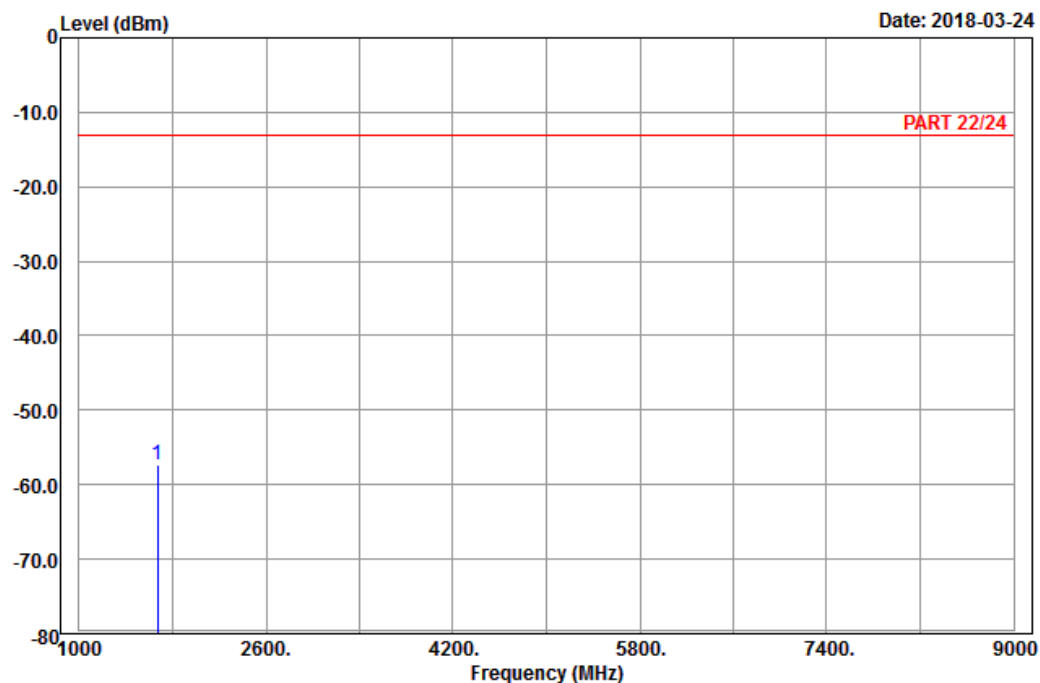
|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1673.00 | -58.24 | -66.15 | -13.00 | -45.24 | 7.91   | Peak   |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1673.00 | -57.37 | -65.28 | -13.00 | -44.37 | 7.91   | Peak   |

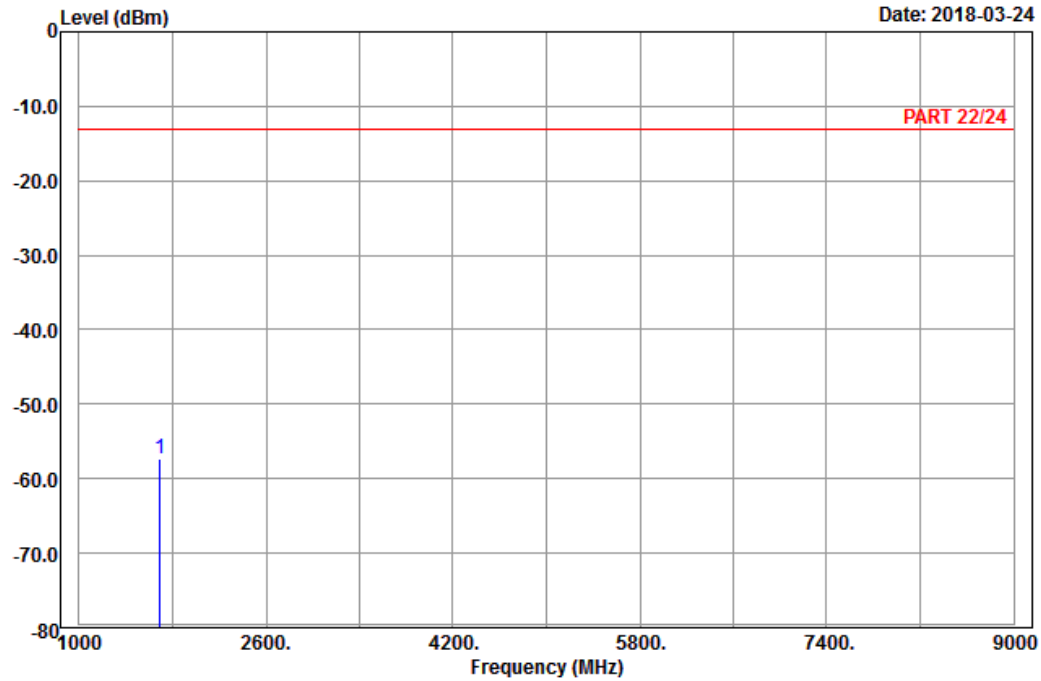
## High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH27015  
 Tested by: Karl Lee

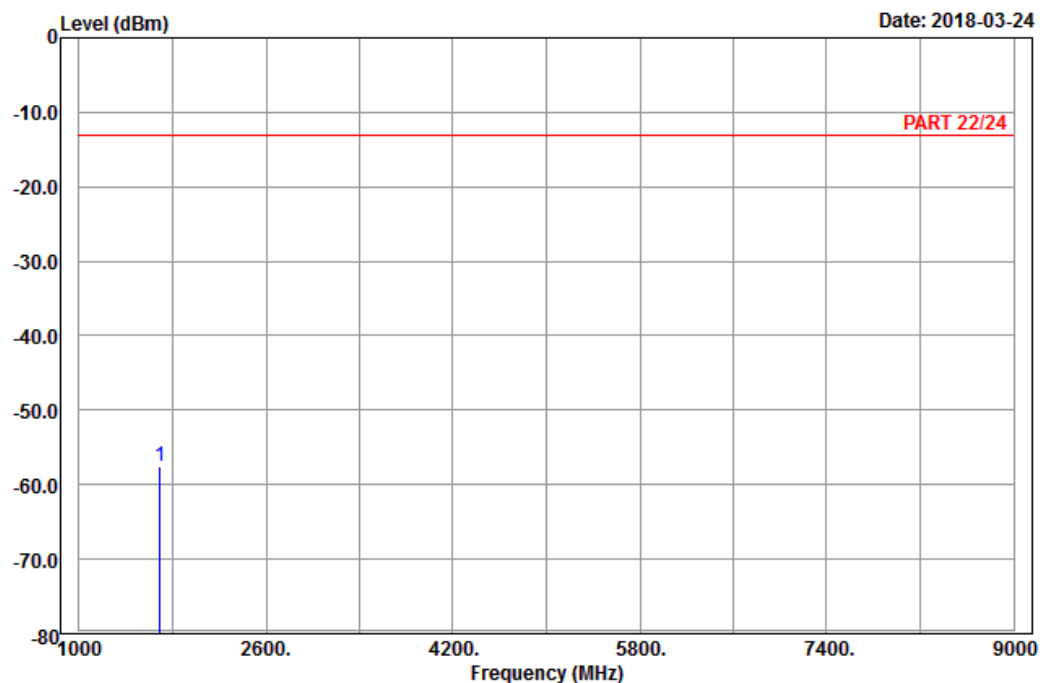
|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1693.00 | -57.35 | -65.37 | -13.00 | -44.35 | 8.02   | Peak   |



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH27015  
 Tested by: Karl Lee

|              |        |        | Read   | Limit  | Over   |        |  |
|--------------|--------|--------|--------|--------|--------|--------|--|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |  |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |  |
| 1 pp 1693.00 | -57.46 | -65.48 | -13.00 | -44.46 | 8.02   | Peak   |  |

Channel Bandwidth: 15 MHz / QPSK  
Low Channel

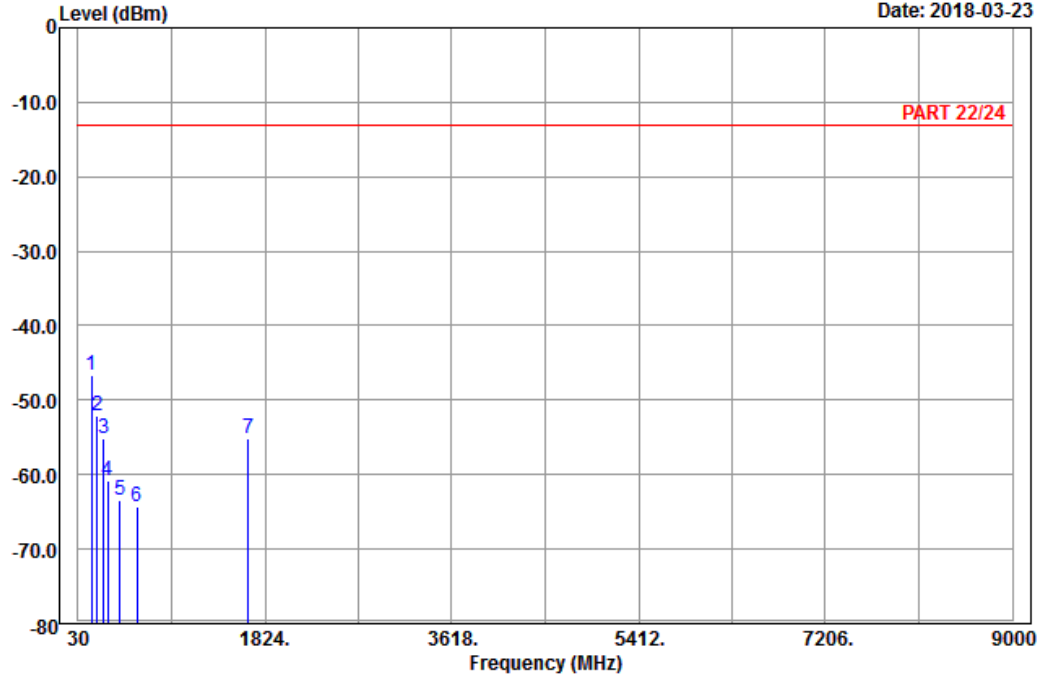


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 26\_Link\_CH26865  
Tested by: Karl Lee

|      |         | Read   | Limit  | Over   |        |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp | 157.71  | -46.56 | -38.84 | -13.00 | -33.56 | -7.72  | Peak   |
| 2    | 214.68  | -52.08 | -46.09 | -13.00 | -39.08 | -5.99  | Peak   |
| 3    | 277.32  | -55.24 | -49.48 | -13.00 | -42.24 | -5.76  | Peak   |
| 4    | 311.20  | -60.71 | -54.89 | -13.00 | -47.71 | -5.82  | Peak   |
| 5    | 432.30  | -63.45 | -59.99 | -13.00 | -50.45 | -3.46  | Peak   |
| 6    | 592.60  | -64.25 | -64.36 | -13.00 | -51.25 | 0.11   | Peak   |
| 7    | 1663.00 | -55.22 | -63.13 | -13.00 | -42.22 | 7.91   | Peak   |

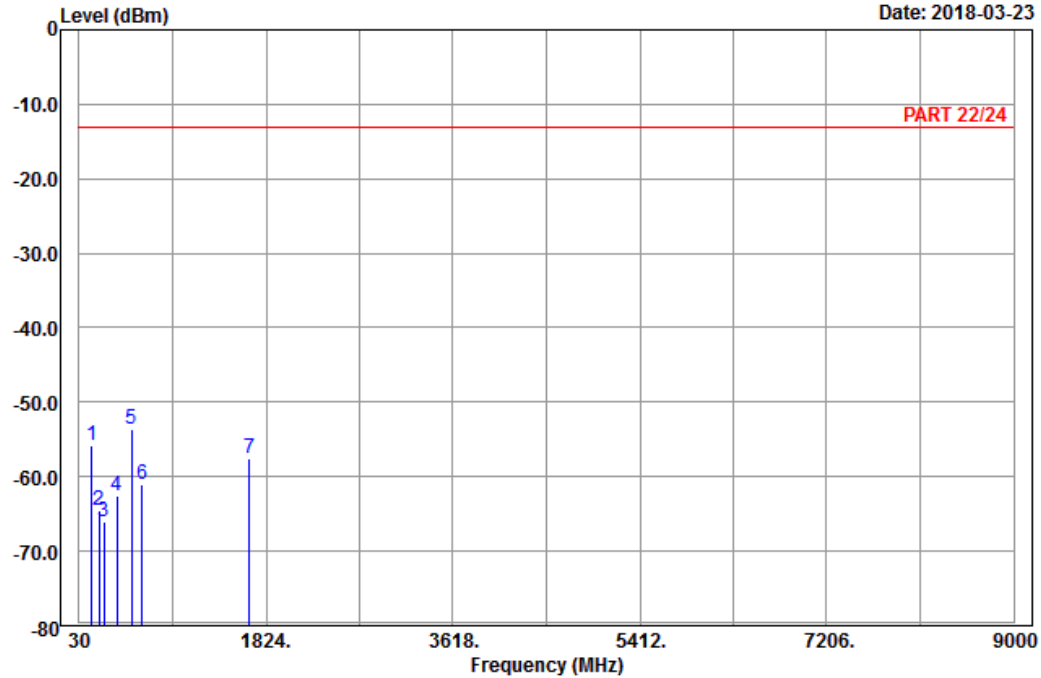


# Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 26\_Link\_CH26865  
Tested by: Karl Lee

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1    | 151.23  | -55.76 | -47.84     | -13.00     | -42.76     | -7.92  | Peak   |
| 2    | 217.92  | -64.57 | -58.63     | -13.00     | -51.57     | -5.94  | Peak   |
| 3    | 268.14  | -66.01 | -60.33     | -13.00     | -53.01     | -5.68  | Peak   |
| 4    | 395.90  | -62.62 | -59.67     | -13.00     | -49.62     | -2.95  | Peak   |
| 5 pp | 531.00  | -53.54 | -50.46     | -13.00     | -40.54     | -3.08  | Peak   |
| 6    | 631.80  | -61.01 | -61.08     | -13.00     | -48.01     | 0.07   | Peak   |
| 7    | 1663.00 | -57.58 | -65.49     | -13.00     | -44.58     | 7.91   | Peak   |

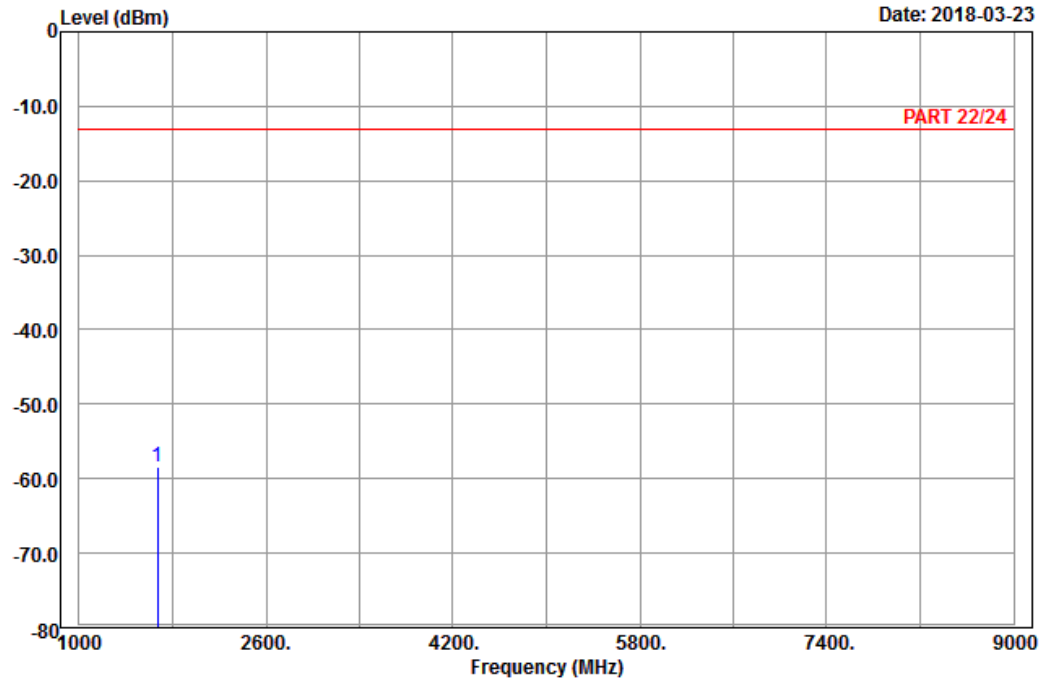
## Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1673.00 | -58.47 | -66.38 | -13.00 | -45.47 | 7.91   | Peak   |

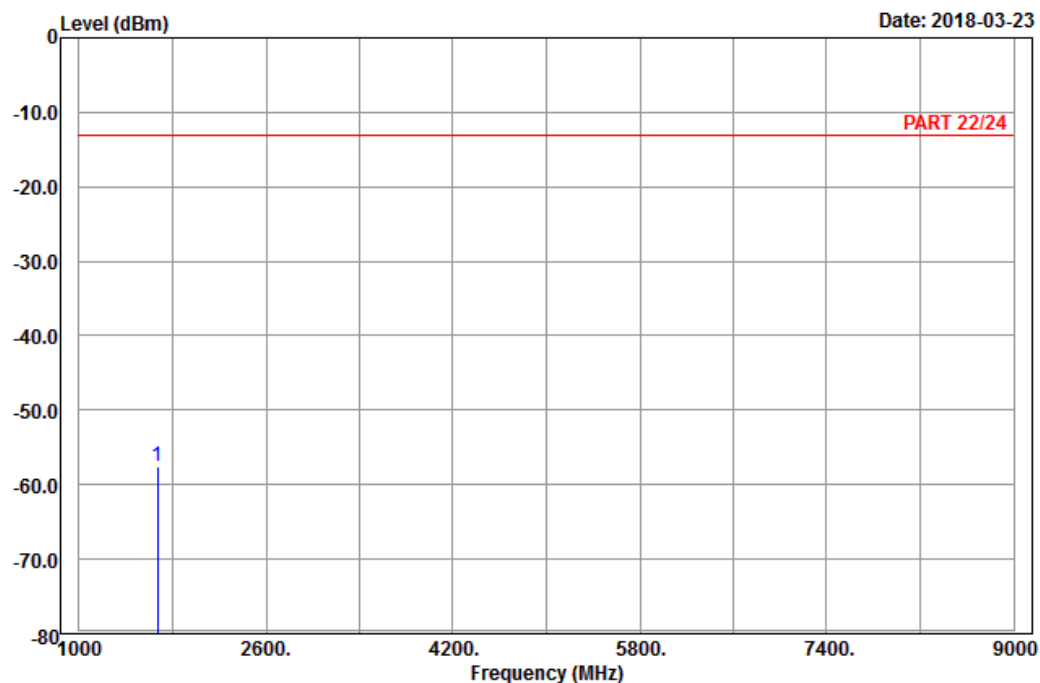


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 26\_Link\_CH26915  
Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1673.00 | -57.64 | -65.55 | -13.00 | -44.64 | 7.91   | Peak   |

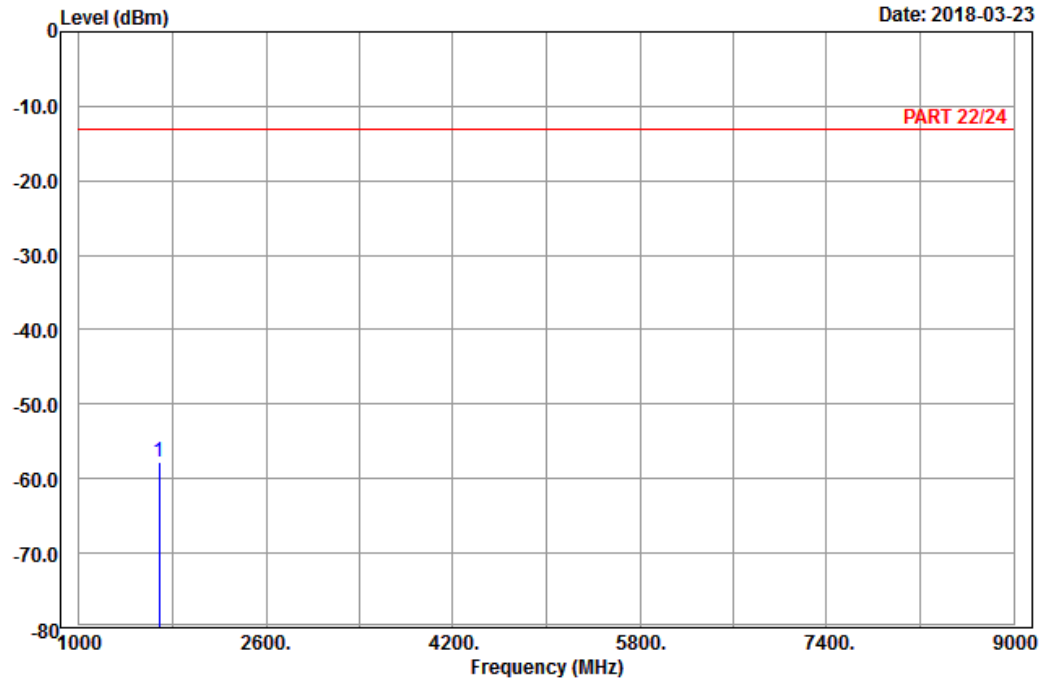
## High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH26965  
 Tested by: Karl Lee

|              |        | Read   | Limit  | Over   |        |        |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq         | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz          | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp 1683.00 | -57.75 | -65.77 | -13.00 | -44.75 | 8.02   | Peak   |

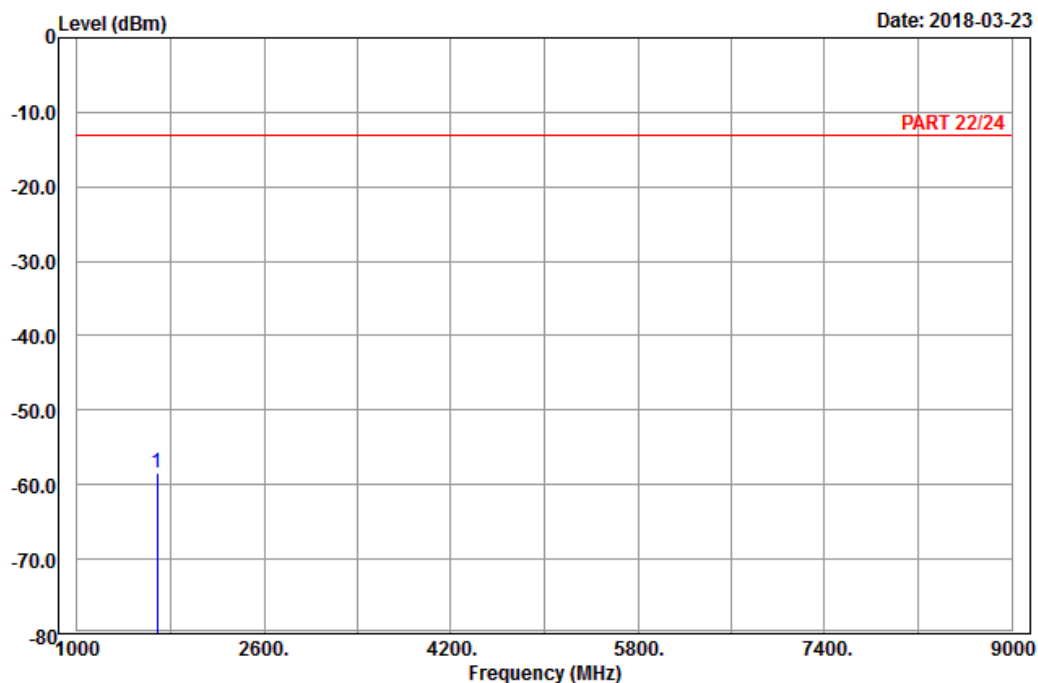


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2018-03-23



Site : 966 chamber 1  
Condition: PART 22/24 Vertical  
Remark : LTE\_Band 26\_Link\_CH26965  
Tested by: Karl Lee

|   |      |         | Read   | Limit  | Over   |        |           |
|---|------|---------|--------|--------|--------|--------|-----------|
|   | Freq | Level   | Level  | Line   | Limit  | Factor | Remark    |
|   | MHz  | dBm     | dBm    | dBm    | dB     | dB     |           |
| 1 | pp   | 1683.00 | -58.47 | -66.49 | -13.00 | -45.47 | 8.02 Peak |

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

--- END ---